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Johan Binneman
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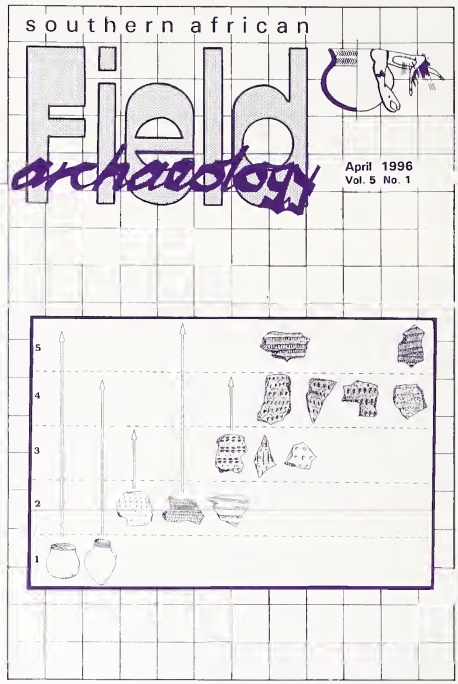

Cover illustration:
Diagram of ceramic types and motifs from rock shelters in the upper Karoo, p. 3.

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OPINIONS

The activities of the Southern African Association of Archaeologists Education Standing Committee over the last year or so have included the organisation of an 'Archaeological representation in school history syllabuses' workshop, provincialising the interim core history syllabus, and liaising with the Parliamentry Education Portfolio Committee. At the SA3 conference held in Bloemfontein in July 1996 it was clear that public education is a strong concern of many archaeologists. Increasing numbers of our profession are involved in *curriculum* content formulation, teacher and pupil training, and resource material production.

The proposed new *curriculum* framework for General and Further Educational Training represents a drastic departure from the content-based core (subject) *curricula* and syllabuses with which most of us are familiar. On the other hand, we need to reformulate our archaeological contribution to school-based teaching and learning. Our input should contribute to areas of learning as diverse as Economic Education and Physical and Natural Sciences, for example. In doing so, we should provide a thematic rather than a chronological picture of the past, with learning outcomes clearly identified.

On the other hand, archaeologists need to examine closely the emphases and structures of their research programmes, particularly in view of the number of frozen posts in institutions throughout the country. Perhaps our research should be structured to encourage a popular awareness of the ways in which people have contributed to South Africa's multicultural identity. This could mean that our activities do not directly benefit archaeology as a discipline at all. Instead,

we could foster an understanding and acceptance of diversity, and promote the tolerance that our multicultural society requires.

If we excavate sites for their potential social and political value, research designs should allow (and budget for) the widest dissemination of heritage information possible. If we achieve this by inviting members of the public to excavate our sites, who should be involved? School pupils and teachers, or foreign students and visitors who pay their own way? Or should we restrict our activities as public archaeologists to writing articles for popular publications, and obtaining local media coverage?

Both public and research-orientated archaeologists would benefit the future of our discipline by going beyond the acknowledgement that archaeology has a social and political role to play through education. We need to accord public archaeology the same recognition that has traditionally gone to rock art studies and historical and spatial archaeology, for example. If institutions obtain funding to establish public archaeology programmes, we will be able to lay legitimate claim to social and political relevance and possibly defrost those frozen posts.

Beth Wahl
Natal Museum
Pietermaritzburg

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LATER STONE CERAMIC STRATIGRAPHY AND DIRECT DATES ON POTTERY: A COMPARISON*

CHARLES A. BOLLONG

Archaeology Centre, Pima Community College,
Tucson, Arizona, 85709

and

C. GARTH SAMPSON

Division of Human Sciences, South African Museum,
P.O. Box 61, Cape Town 8000
and
Department of Anthropology, Southern Methodist University,
Dallas, Texas, 75275-0336

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ABSTRACT

Unstratified fills in rock shelters of the upper Karoo, spanning the last millennium, are subjected to fine-scale correlation using Later Stone Age ceramic marker motifs. A five-phase framework generated by direct dates (thermoluminescence and radiocarbon) on surface sherds provides the sequence of markers. Before this framework can be applied as a heuristic device for the planned seriation of surface sites,it must be validated by stratified sequences. Excavated marker sherds were projected on to the composite sections of eight shelter fills, and their positions were used to identify phase boundaries. Results show that multiple, unpatterned gaps in occupation are a hallmark of all the shelters. Alternately, the five-phase framework is too simple a construct to reflect reality. However, stratified charcoal dates in three shelters have also revealed occupation gaps, thus supporting the first interpretation. Nonetheless, the dated framework remains incomplete since new potential marker motifs can be identified in the stratified sequences.

INTRODUCTION

Slow rates of change in the shapes and frequencies of Later Stone Age lithic tools over the past millennium make them poor chronological markers. Although very abundant in the unstratified fills of Karoo rock shelters, lithics are of little use for fine-scale correlations between excavated sites (Pease 1993). While much scarcer, the LSA ceramics associated with the stone tools exhibit more rapid change and are potentially more sensitive markers. Sherd samples were recovered from several shallow rock shelter fills in the upper Seacow River valley, but fine-scale correlations were hampered by inadequate sherd numbers and by doubts about churning of the deposits (Sampson *et al.* 1989). The goal of this correlation was to provide a basis for chronological seriation of much larger samples collected from about a thousand surface sites in the same area (Sampson 1988; Hart 1989). Chronological resolution was greatly improved by direct dating of sherds from surface sites. Twelve thermoluminescence (TL) dates were obtained from fine-grain minerals in pastoralist (ancestral Khoi) wares (Sampson *et al.* in press), and thirty radiocarbon dates were obtained from fibre temper in the cooking bowls made by the herders and by their hunter-gatherer neighbours (Sampson & Vogel 1995).

All dates obtained directly from surface sherds are summarised in Figure 1, with all calibration intercepts for each radiocarbon date plotted on the same framework. Five phases are suggested by these data, each phase represented by a unique combination of stamp-impressed motifs in the fibre-tempered bowls. While valuable as a heuristic device for seriation, the validity of this five-phase framework is still not completely secure. An untested assumption of the scheme is that the age-range of each dated motif is fully covered by the available dated sherds. When the purported age range for any radiocarbon-dated motif is plotted against the number of dates run on that motif, it emerges that motifs with longer ranges are invariably represented by more dates and *vice versa* (Fig. 2). If more dates were run on the short-lived motifs would they not, too, emerge with

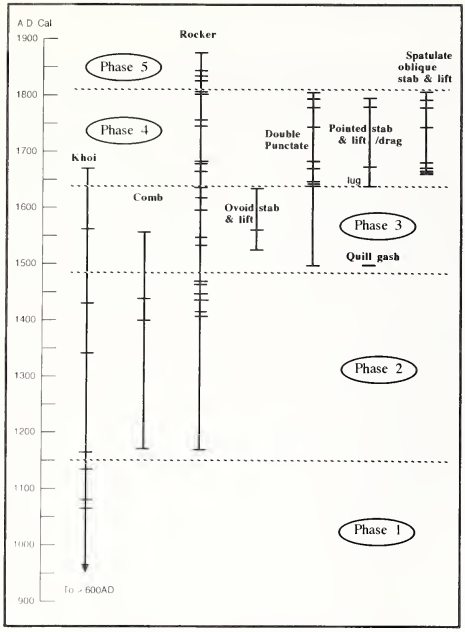

Fig. 1. Summary chart of direct dates obtained for upper Seacow valley ceramics. Dates are short horizontal bars; age-ranges for individual marker types/motifs are vertical bars; dashed lines denote phase boundaries. Khoi and Comb are TL dates, after Sampson *et al.* (in press). The rest are radiocarbon dates, after Sampson & Vogel (1995).

longer life histories? Clearly, the weakest part of this proposed framework is Phase 3, characterised by two motifs for which only one date each is available.

In this paper we return to the original sherd stratigraphies in the excavated rock shelters to test the validity of the new five-phase framework. Previously, the excavated samples had been systematically searched for refits in order to resolve questions of localised churning (Bollong 1994). For each shelter fill, sherd positions are projected on to a composite section of the deposit and the section is then sliced into superimposed chrons based on the combinations of sherds present at different levels. The range of sherds in the fitted chron at the base of the fill should contain sherds that match the composition of Phase 1 in the framework, and so on up the sequence. However, occupational gaps are known to occur (Hart 1989) and some shelters will have too few sherds to supply an adequate test. Also, it is intuitively reasonable to expect Phase 3 to test poorly. Finally, we should expect other motifs not covered by the dating program to show up on individual sections. It may be possible to add some of these to the overall scheme if they show up consistently in certain phases in all tested shelters.

Shelter locations and trench dimensions are given in Sampson *et al.* (1989), as are details of the recovery and recording procedures.

RESULTS

Subdivision of eight shelter fills into equivalent phases can be attempted. Bloubos and Van Zyls Rus Shelters are not considered here because their sherd samples are too small to allow reasonable comparisons.

Volstruisfontein Shelter

Whether Phase 1 is present at the base of this small trench (Fig. 3) remains uncertain because the lowermost specimens form an isolated patch of rare, small crumbs of undecorated fibre-tempered ware. If these have not been churned in from above, they are still not certainly of Phase 1 date because there are no Khoi sherds with them, a required marker for Phase 1. Also, one of the deepest crumbs may have a trace of comb stamp decoration on its outer surface. If so, then Phase 2 may begin the Volstruisfontein sequence. The latter interpretation is preferred because it is supported by the basal date of the overlying unit. Phase 2 is better represented by the modest, but adequate sample of Khoi, rocker and comb stamp sherds found mid-way through the deposit. A radiocarbon date on charcoal from the base of this horizon gave 560 ± 70 BP (uncal.) (Hart 1989), which fits with the later part of the Phase 2 chronology (Fig. 1).

Evidently the extremely rare cord-impressed decoration belongs in later Phase 2. The recovery of two refitting sherds with this motif is fortunate, since so little corded ware was found elsewhere in the valley (Sampson 1988:98) and no direct dates could be obtained.

The fibre-tempered lug fragment and the refitted undecorated sherd fragment next to it in the Phase 2 level (Fig. 3) is problematic because the lug fragment fits to another from much higher in the sequence in a position ascribed to Phase 4 (see below). Rodent burrows were reported in this vicinity (Hart 1989). A pair of refitting plain fibre-tempered sherds from the Phase 2 level nearby shows that this disturbance was highly localised. While there is clearly an isolated disturbance, it is less clear whether the disruption has caused one of the two separated sherds to move up or down the sequence. The one available direct date for a fibre-tempered lug placed this attribute in Phase 4 (Fig. 1), but that specimen was also decorated (the Volstruisfontein fragments are plain). This direct date could support a case for the uppermost fragment being *in situ* while the lower two have been carried downwards. However, a reverse scenario is even more plausible (two below *in situ*, one moved above), especially in the light of evidence from Haaskraal (see below).

Phase 3 cannot be confirmed in the overlying lens for want of suitable markers. The lower interface of the lens is clearly demarcated by a sharp decrease in faunal density (Sampson & Plug 1993:62). Within this (Phase 2?) lens, comb stamp outnumbers rocker stamp sherds which is to be expected since Volstruisfontein is located within in the densest patch of comb stamp distribution in the upper valley (Sampson 1988). The refits and close matching patterns of the comb stamp sample suggest that they are all from the same vessel.

Unfortunately none of the three Phase 3 marker motifs

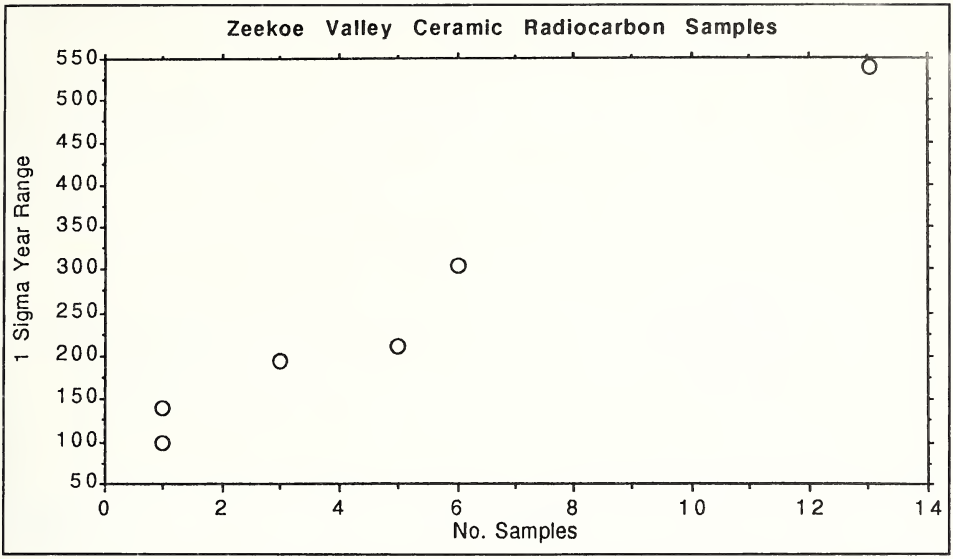

Fig. 2. Covariance between purported age-ranges of six radiocarbon-dated motifs, and the number of vessels dated per motif.

(ovoid stab and lift, double punctate, and quill) is present. This is also to be expected since these motifs were extremely rare (double punctate) or absent (ovoids, quill) from this side of the upper valley (Sampson 1988). Although the lens could be a late deposit of Phase 2, this cannot be confirmed until further charcoal dates are obtained or the sample is increased.

Phase 4 is apparently represented by the overlying lens at the back of shelter. This lens yielded one rocker stamp sherd and a possible sherd of the Phase 4 marker motif, the large spatulate oblique stab and lift. However, the stylus used on this specimen was of pyramidal shape and the angle of entry was not markedly oblique, so this is not a typical specimen. Khoi and comb stamp are absent. Also in the Phase 4 lens are two variants of the marker motif, namely small spatulate, oblique stab and lift and the large spatulate vertical stab and lift. Their association here is fortunate since neither was sampled by the direct dating program. The lug fragment is probably derived (see above).

Phase 5 is also well defined by the presence of European items in the deposit (Voigt *et al.* 1995) and by a sharp decline in faunal density (*ibid.*). There is a relatively deep lens at the rear of the shelter and another shallower lens near the drip line. Only rocker stamp sherds are present in this near-surface unit, which matches well with the new framework.

Haaskraal Shelter

Two separate excavations were conducted at this site, one in the shelter fill and another in the talus rubble which built up behind a dry stone (kraal) wall outside the shelter. The trench system inside the shelter is too varied to permit a single composite section of the whole deposit, and the forward angle of dip of the fill also prevents a composite view running parallel with the rear wall. Consequently three views must be presented, with sherd positions in only the nearest meter of deposit projected on to each.

The first composite section is of the trench running from the back wall of the shelter (trench JIEA), through a historical stone wall at the drip line and out on to the top of the talus (Fig. 4). A very small Phase 1 sherd sample is present at the base of the ceramic sequence, with a single Khoi and several plain fibre-tempered sherds. It is not visible at the back of the shelter. Two charcoal dates of 1140 ± 60 BP (uncal.) and 1180 ± 70 BP (uncal.) were obtained from this thin horizon (Hart 1989), dates which are in keeping with those obtained directly from Phase 1 vessels (Fig. 1).

Phase 2 is clearly demarcated in the trench by rocker stamp, a possible comb stamp and several Khoi sherds. Interfaces cannot be discerned at the back of the shelter for want of adequate samples. There is also a small spatulate stab and drag pattern which was not tested in the direct dating program. The pair of matching, fibre-tempered lug fragments is firmly positioned in Phase 2. Only the latest part of Phase 2 is present in the shelter. A charcoal date of 544 ± 43 BP (uncal.) (Hart 1989) together with AMS dates from sheep remains at 410 ± 65 BP (uncal.) and from cattle remains at 515 ± 65 BP (uncal.) (Plug *et al.* 1994) indicate a 500 year gap in the sequence at the interface between Phases 1 and 2. This gap coincides with the dearth of direct dates for early Phase 2 (Fig. 1).

There could be another break above Phase 2 since

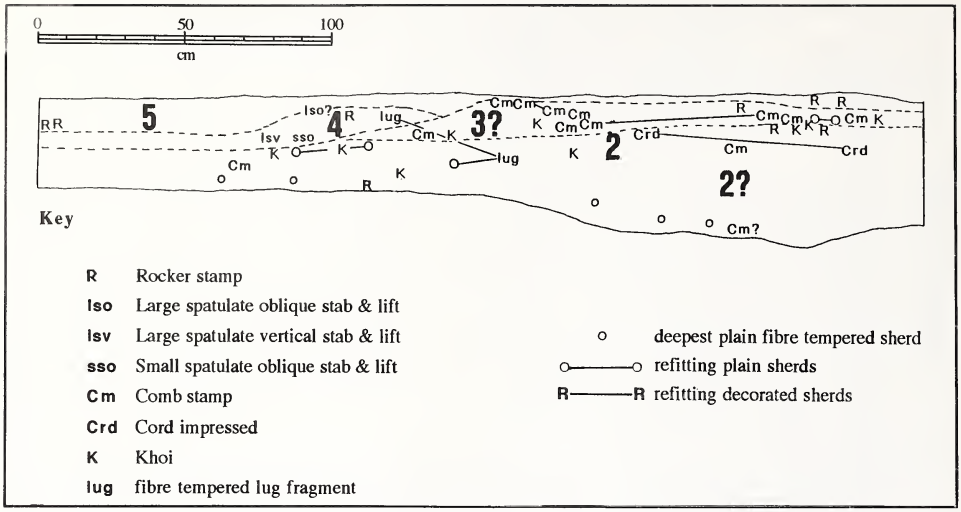

Fig. 3. Phase boundaries (stippled lines) in Volstruisfontein Shelter, showing positions of marker sherds in each numbered phase.

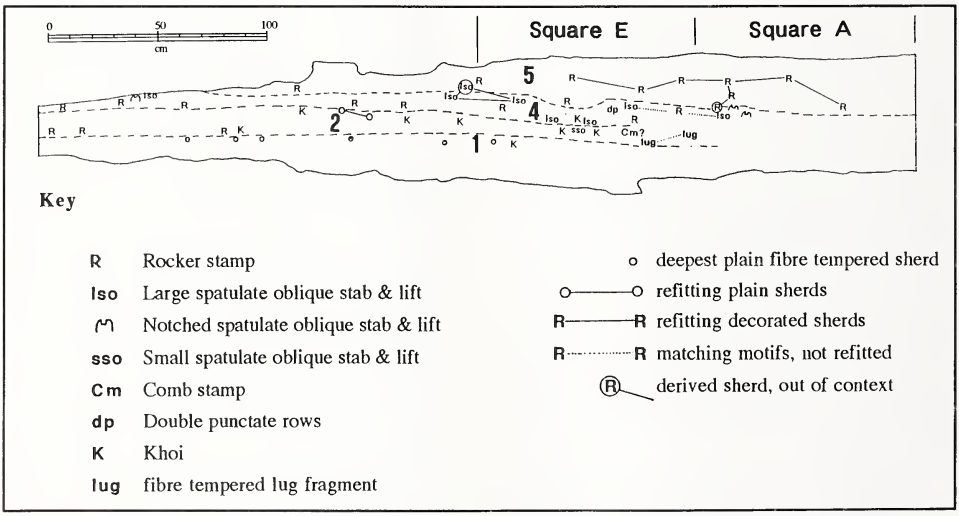

Fig. 4. Phase boundaries (stippled lines) in Haaskraal Shelter trench JEIA, showing positions of marker sherds in each numbered phase.

Phase 3 cannot be discerned at all by ceramic criteria. Also, there are no charcoal dates that might confirm this period.

Phase 4 is well represented in the trench, although its lower interface cannot be defined at the back of the shelter. Its upper level has been pitted in at least two places where historical livestock remains were buried into Phase 4 from above (*ibid.*). There are rocker stamp sherds, a single Khoi specimen, and a double punctate. The typical Phase 4 marker, large spatulate stab and lift, is very well represented, including three refitted sherds and a pair of matching patterns. Also present are good examples of the notched spatulate stab and lift motif, and a specimen of double-notched spatulate stab and lift,

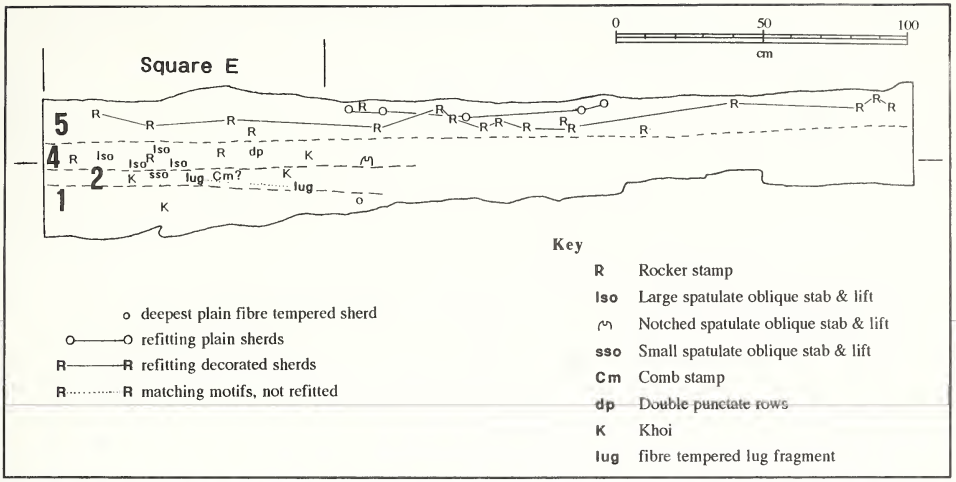

Fig. 5. Phase boundaries (stippled lines) in Haaskraal Shelter trench EFG, showing positions of marker sherds in each numbered phase.

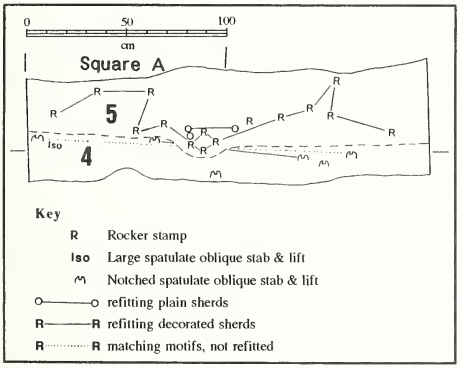

Fig. 6. Phase boundaries (stippled lines) at the back of Haaskraal Shelter (squares AB), showing positions of marker sherds in each numbered phase.

neither of which was covered by the direct dating program. The local disturbances have intruded a Phase 5 rocker (together with a glass trade bead) sherd into this level. Fortunately it refits to a Phase 5 bowl distributed above it (Bollong 1994). Also, a single large spatulate sherd was certainly dug out of Phase 4 into the base of overlying Phase 5 levels, because the sherd refits to a pair firmly positioned in Phase 4.

Phase 5 is exceptionally well represented by a set of refitting rocker stamp sherds from a single bowl, associated with European artifacts and livestock (Hart 1989; Voigt *et al.* 1995). As predicted by the direct dating program, there are no other motifs present, nor is there any Khoi.

The second composite section (EFG) is at right angles to trench JIEA and runs parallel with the back wall. It has one meter square (E) in common with the first trench (Fig. 5). The contents of this square also defines the division ofthe whole of trench EFG, which contributes no new information. There is another plain fibre-tempered sherd in Phase 1, and another notched spatulate stab and lift in Phase 4. Many more conjoining pieces of the rocker-stamped bowl in Phase 5 were recovered from this trench at the same levels as numerous European item sand livestock remains. There are also some refitted undecorated sherds from above the rocker refits.

Two squares at the back of the shelter (Fig. 6) include one (A) which overlaps the back of trench JIEA. The lower part of the sequence is truncated here by bedrock. There are are more notched spatulate stab and lift sherds in Phase 4, two of which refit. There is also a pair of matching double-notched spatulates from two meters apart. Several more refitting pieces of the rocker stamp bowl are present in Phase 5 along with some undecorated refits. The disturbance caused by pitting of the lower levels of Phase 5 can be traced through the refits. European items and livestock remains were also involved in this localised churning.

Overall, Haaskraal shelter fits reasonably well with the phase sequence constructed from the direct dates, and it even shows a clear gap in early Phase 2. Once again, Phase 3 cannot be resolved in the stratified sequence because its marker motifs are generally scarce in the west side of the upper Seacow valley.

Haaskraal Talus

The diagonal slope of the deposits across the excavations makes it impossible to project all the sherd

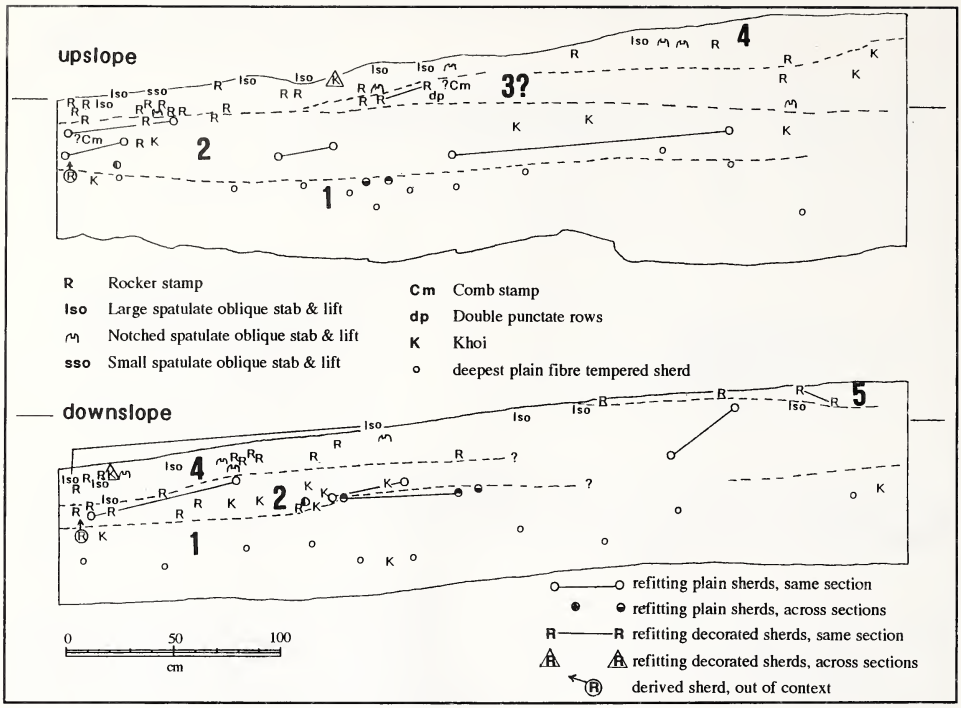

Fig. 7. Phase boundaries (stippled lines) in upslope and downslope sections of Haaskraal Shelter talus, showing positions of marker sherds in each numbered phase.

positions on to one composite section. Interfaces between ceramic zones also slope forward, and these become so blurred on a single section that they cannot be defined. Consequently two sections are shown of the upslope and downslope halves of the deposit (Fig. 7).

In the upslope half, Phase 1 is represented at the base of the sequence by only one Khoi sherd together with several fibre-tempered plain sherds, some of which occur deeper in the deposits. A small crumb of rocker stamp ware near the Khoi sherd may be a wall drop from above, but it is too small to match with any Phase 2 rocker patterns. A few plain refits help to tie the upslope and downslope interfaces together correctly.

The Phase 2 levels yielded a small but unambiguous sample that includes Khoi, rocker stamp and comb stamp only. There are several refits, some of which cross to the downslope section.

Phase 3 may be present on the talus, with Khoi, rocker stamp, comb stamp and double punctate, the latter being a Phase 3 marker. Three other sherds are possibly double punctate or an early expression of notched spatulate. Rocker stamp outnumbers comb stamp, which is to be expected since Haaskraal is situated on the outer edge of comb stamp distribution in the upper valley (Sampson 1988).

Phase 4 is very well defined by the uppermost layer of rare Khoi, some rocker stamp, double punctate, and several sherds of large spatulate stab and lift which is the marker for Phase 4. A few, good examples of notched spatulate stab and lift also occur here, and a small spatulate oblique stab and lift. As neither of these motifs were directly dated, it is useful to have both sealed in Phase 4 deposits. Comb stamp is absent, as predicted by the direct dating scheme (Fig. 1).

Phase 5 is missing from the upslope half of the talus deposits. This is confirmed by the absence of European artifacts, but there are a few fragments of possibly European-derived livestock at the surface (Plug *et al.* 1994:39).

In the downslope half of the deposits, Phase 1 is somewhat better represented at the base of the sequence by Khoi and undecorated fibre-tempered ware, although there is again a solitary crumb of the latter with a hint of impressed decoration. Although the kraal wall itself yielded a rocker stamped sherd at this level, the slope dips towards the wall in such a way that this specimen must belong to the overlying horizon.

Phase 2 is well defined and contains only Khoi and rocker stamped sherds. However, none was recovered from the east end of the trench, thus the interfaces that bound Phase 2 cannot be accurately delineated. Sediment between the rocks in the kraal wall itself produced a

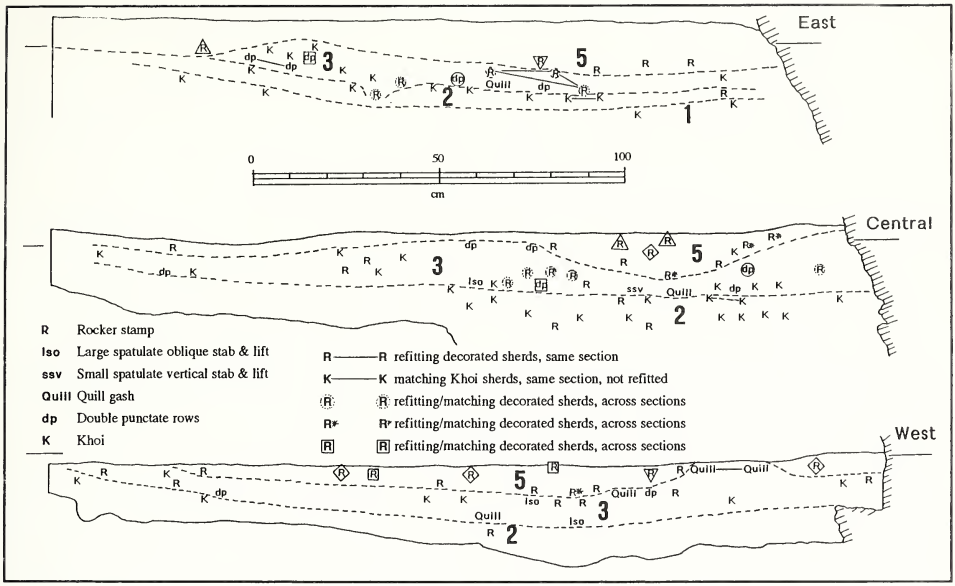

Fig. 8. Phase boundaries (stippled lines) in Driekoppen Shelter, showing positions of marker sherds in each numbered phase.

large spatulate oblique stab and liftspecimen, which is ascribed to the overlying layer, based on the angle of dip projected into the wall.

Phase 3 cannot be demarcated for want of marker specimens. Although there are no anomalous sherds present between the estimated interfaces, the sample is too small to be certain. A pair of refitted plain sherds in the downslope section (right) points unambiguously to a local disturbance in the deposits.

Phase 4, by contrast, is well delineated by an adequate sample of rocker stamp, large spatulate stab and lift, and notched spatulate stab and lift. There is also a Khoi sherd which refits to one from the upslope Phase 4 level. A plain sherd also refits to one in Phase 2, signaling the only localised disturbance to bedetected.

Phase 5 is represented by a thin surficial horizon at the east end of the trench. One of the three rocker specimens in this unit refits to the near-complete Phase 5 bowl from the shelter, so the ascription to this phase is confirmed even though the sherd sample is small.

Overall, the ceramic sequence in the talus reflects the direct dating framework of five phases. This suggests in turn that the talus has sound stratigraphic integrity and is not widely churned or mixed, as was originally proposed by Sampson *et al.* (1989). In this light, the near-modern radiocarbon date (SMU-1639) from diffused charcoal grains (Hart 1989) in the Phase 2 levels is a clear contradiction, which remains to be explained.

Driekoppen Shelter

Three contiguous composite sections are needed, each two metres thick and running from the rear wall out to the drip line (Fig. 8) in order to cover this extensive excavation. The deposits dip slightly from the talus down to the rear wall, but large firepits disrupt the layering of the the central and west areas. The sherds are are unusually small in this site, and refits between sherds are few. However, small, matching pieces of some vessels can be traced across large areas of the fill.

Phase 1 is relatively well defined at the deeper east end of the fill where only Khoi and undecorated fibre-tempered sherds occur at the base of the sequence. It either lenses out or is truncated by a disturbance half way through the central section, and it is truncated by sloping bedrock in the shallow west section.

Phase 2 deposits are clearly defined in all three sections as a continuous horizon with Khoi and rocker stamp only. This shelter may be outside the distribution of comb stamp ware, which would explain its absence from here.There may be some churning in the central section.

Phase 3 is well represented in the overlying layer which contains Khoi, rocker stamp, quill, and double punctate decorations. A motif not covered by the direct dating program is also present in these levels, namely small spatulate vertical stab and lift. There are definite sherds with large spatulate oblique stab and lift near the base of this layer in the central and west sections. Since the dating program isolated this motif as a good marker for Phase 4 only, this clearly conflicts with those results. Either the motif is also present in Phase 3, or the overlying Phase 4 layer has been churned into the underlying levels.

Phase 4 is apparently missing from the sequence.

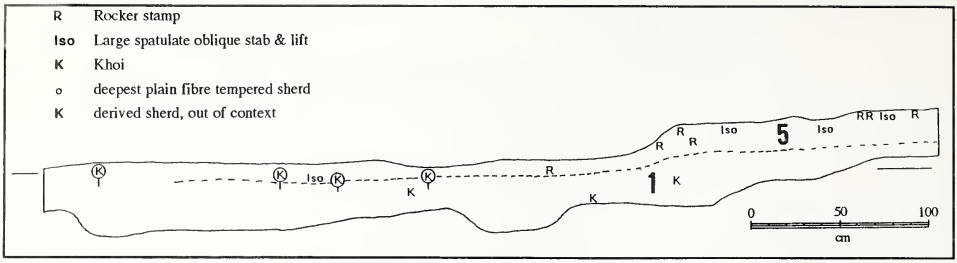

Fig. 9. Phase boundaries (stippled lines) in Leeuhoek Shelter, showing positions of marker sherds in each numbered phase.

Phase 5, containing only rocker stamp sherds, is certainly present but there are signs of heavy disturbance in the central and possibly in the west sections where large, charcoal-filled fire pits were dug into the underlying levels. Consequently a piece of Khoi pottery, and possibly other pieces, have been moved upwards in the central section. Two quill sherds in the west section probably suffered a similar fate. European items have also been thrust down into underlying Phase 3 levels in some places.

Overall, the shallow Driekoppen fill with its high yield of decorated sherds has yielded a clear sample of Phase 3, but the normally well defined Phase 4 is absent or at best ephemeral and destroyed by later disturbances. Also, the integrity of the main Phase 4 marker motif (large spatulate oblique stab and lift) is called into question.

Leeuhoek Shelter

The composite section of this fill runs parallel with the rear wall, and sherd positions have been projected on to the profile from one metre on either side of the section (Fig. 9). This extensive fill is very shallow and compressed. There may be an ephemeral Phase 1 sample at the base of the sequence, but the sample is too small to be certain. There is a substantial gap in the record, followed by a Phase 5 deposit heavily laden with European artifacts and livestock (Voigt *et al.* 1995), and associated with a stone wall built up almost to the ceiling. In the thinnest and most compressed part of this layer there are four Khoi sherds which are surely derived from below. In the thicker, undisturbed part ofthe layer there are sherds with a typical large spatulate oblique stab and drag motif. These are definitely *in situ* and in direct association with the Phase 5 rocker stamp sherds. Stab and drag motifs were not covered by the direct dating program, and this is the only proof that any non-rocker motif survived into Post-contact times in the upper Seacow valley.

Abbot's Cave

Here, the composite section runs across the middle of the cave from one side wall to the other, with sherd position from two metres at the back and two metres at the front projected on to the profile (Fig. 10). Phase 1 may be present at the base of the sequence, but there is only one Khoi sherd at this level so the sample is not adequate for firm identification. There was not enough charcoal to obtain radiocarbon dates from the base of the sequence.

Phase 2 is moderately well represented with Khoi and rocker stamp sherds, but there are also four radiocarbon dates on charcoal (stippled outlines in Fig. 10) spanning 760 ± 50 BP (uncal.) to 430 ± 50 BP (uncal.), which firmly establish this layer as later Phase 2. It is note worthy that the rocker stamped sherds are all in the upper portion of this layer, reflecting the distribution of direct radiocarbon dates of this motif (Fig. 1). The solitary sherd with large spatulate oblique stab and lift from Phase 2 levels is almost certainly derived from above due to localised burrowing (there is a European peach stone from near this sherd).

Phase 3 is apparently missing from the sequence. The purported Phase 3 marker motifs were relatively common on the east side of the study area (Sampson 1988), so their absence is less likely to result just from regional scarcity.

Phase 4 is clearly demarcated by two large spatulate oblique stab and lift specimens associated with several rocker stamped sherds, by a solitary Khoi sherd, and by a charcoal date (stippled in Fig. 10) of 250 ± 50 BP (uncal.). Three sherds with small spatulate oblique stab and lift are also firmly associated with the layer. This motif was not included in the direct dating program.

Phase 5 is clearly demarcated by an abundant sample of European artifacts and livestock (Voigt *et al.* 1995) with a thick capping of compact sheep dung. A charcoal date at the base of the layer gave 100 ± 45 BP (uncal.). Besides the ubiquitous rocker stamp sherds, the layer yielded is a solitary Khoi specimen and another which may be comb stamp rather than rocker. These, and a heavily worn notched spatulate speciment from the surface dust, are almost certainly derived through ground squirrel burrowing from the lower levels. The origin of a solitary sherd with small spatulate oblique stab and drag is less certain.

Lame Sheep Shelter

The composite section also runs through the middle of this fill, with sherd positions from two metres on either

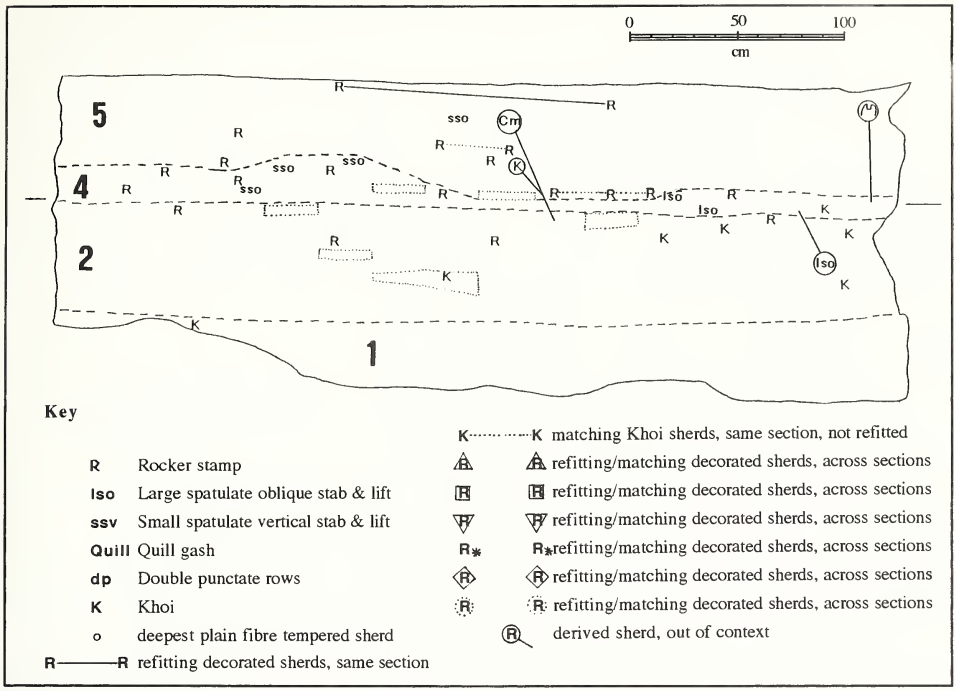

Fig. 10. Phase boundaries (stippled lines) in Abbot's Cave, showing positions of marker sherds in each numbered phase.

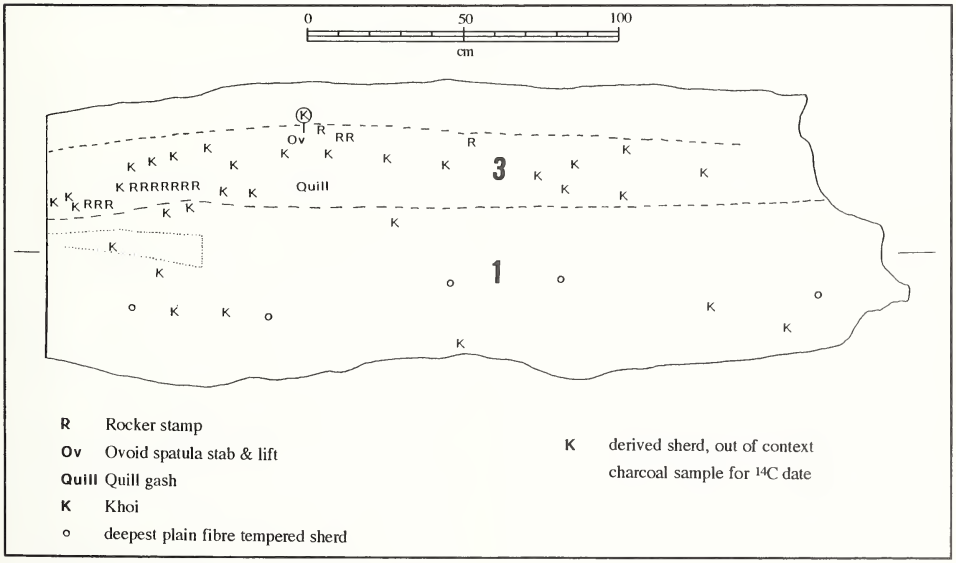

Fig. 11. Phase boundaries (stippled lines) in Lame Sheep Shelter, showing positions of marker sherds in each numbered phase.

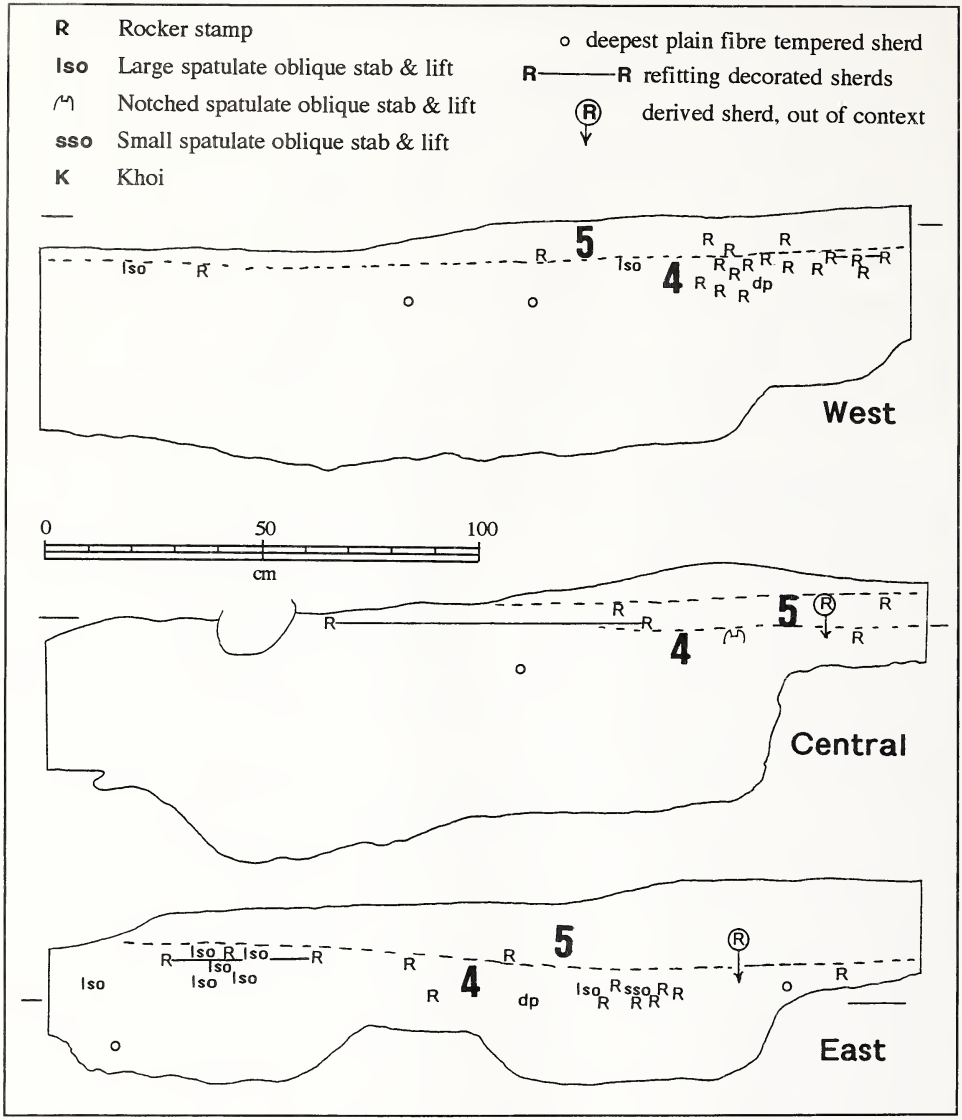

Fig. 12. Phase boundaries (stippled lines) in Boundary Shelter, showing positions of marker sherds in each numbered phase.

side of it projected on to the profile.

Phase 1 is unusually well represented here, in contrast to the neighbouring Abbot's Cave deposits. There are numerous Khoi and undecorated fibre-tempered sherds in the base of the Lame Sheep sequence, with a charcoal sample (stippled in Fig. 11) dated to 1350 ± 50 BP (uncal.). There are remains of cattle and sheep in this layer (Voigt *et al.* 1995).

Phase 2 appears not to be present, even though it is well represented in Abbot's Cave next door.

Another marked contrast with the neighboring fill is that Phase 3 is exceptionally well represented here. Besides relatively abundant Khoi sherds, there are several pieces of the same rocker stamped vessel, and both the distinctive Phase 3 marker motifs are present. As predicted by the scanty direct dating evidence (Fig. 1) the quill sherd underlies the ovoid (round) stab and lift motif.

Again contrasting with the neighboring fill, the rest of

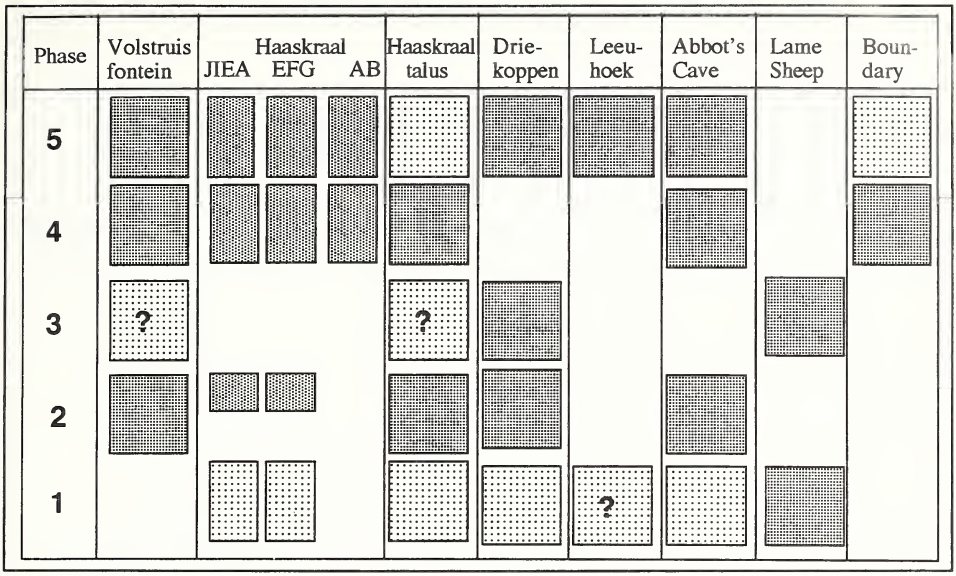

Fig. 13. Correlation chart of ceramic phases present in eight shelters. Light stipple denotes ephemeral presence.

the sequence is missing from this shelter. The reasons for this oscillating occupation of adjacent caves is not easily explained, but may have something to do with early inaccessibility to Abbot's, followed by a side wall collapse which opened it to the elements. A still later roof collapse at Lame Sheep probably made it less attractive than the adjacent cavity in the later phases.

Boundary Shelter

A composite section of the west end of the excavation allows sherds across 2.75 meters of the fill to be projected on to it (Fig. 12). As the fill slopes sharply upwards in the easternmost portion of this trench, it is shown separately as a central, 25 cm wide slice. A second trench at the elevated eastend of this shelter is shown as a composite with sherd positions projected on to it from up to a metre away.

The first ceramic level to occur in this shelter is of clear Phase 4 composition. There are rocker stamp, large spatulate stab and lift, and double punctate sherds in sufficient numbers to make this a reasonably firm identification. Khoi is absent. There are also motifs which were not incorporated in the direct dating program, namely small spatulate oblique stab and lift, and notch spatulate stab and lift.

Phase 5 is not well represented in the overlying layer which also contains European artifacts and livestock. There are too few rocker stamp sherds and specimens in the east and central sections match a vessels from the underlying Phase 4 layer. This was probably derived from upslope outside the shelter and brought in with the sterile hillwash that flowed in from the side of the shelter to cap the Phase 5 deposit.

FINE-SCALE CORRELATIONS

A correlation chart for ceramic phases in the eight excavated rock shelter deposits is shown in Figure 13. All the shelters show gaps in their depositional history, except possibly Haaskraal talus. Phase 1 is represented by only one substantial accumulation at the base of the Lame Sheep Shelter, while three others have small samples and Leeuhoek may have an ephemeral trace. The foundations of the kraal wall on the Haaskraal talus (Hart 1989) is probably tied to this horizon.

Phase 2 is well represented in four deposits and absent in three others on the east side of the upper valley. Only Haaskraal Shelter has sufficient associated charcoal dates to demonstrate a depositional hiatus in the first half of Phase 2.

Phase 3 is clearly demarcated in Driekoppen and Lame Sheep, but cannot be confirmed at Volstruisfontein or Haaskraal talus because the marker motifs for the phase are too rare and were not recovered in the appropriate levels. It cannot be discerned at all in four of the other deposits.

Phase 4 is firmly established in four shelters, but missing from three others. There are no small samples with insufficient marker motifs.

Phase 5 is also well represented in five deposits and ephemerally present in two others. Only Lame Sheep is evidently without this phase. There is no obvious patterning in the occurrence of depositional gaps. Even between adjacent deposits like Abbot's and Lame Sheep, the sequences are not the same. Overall, there are more hiatuses in the eastern cluster of shelters. Although Phases 1 and 3 are not as well supported by the stratified

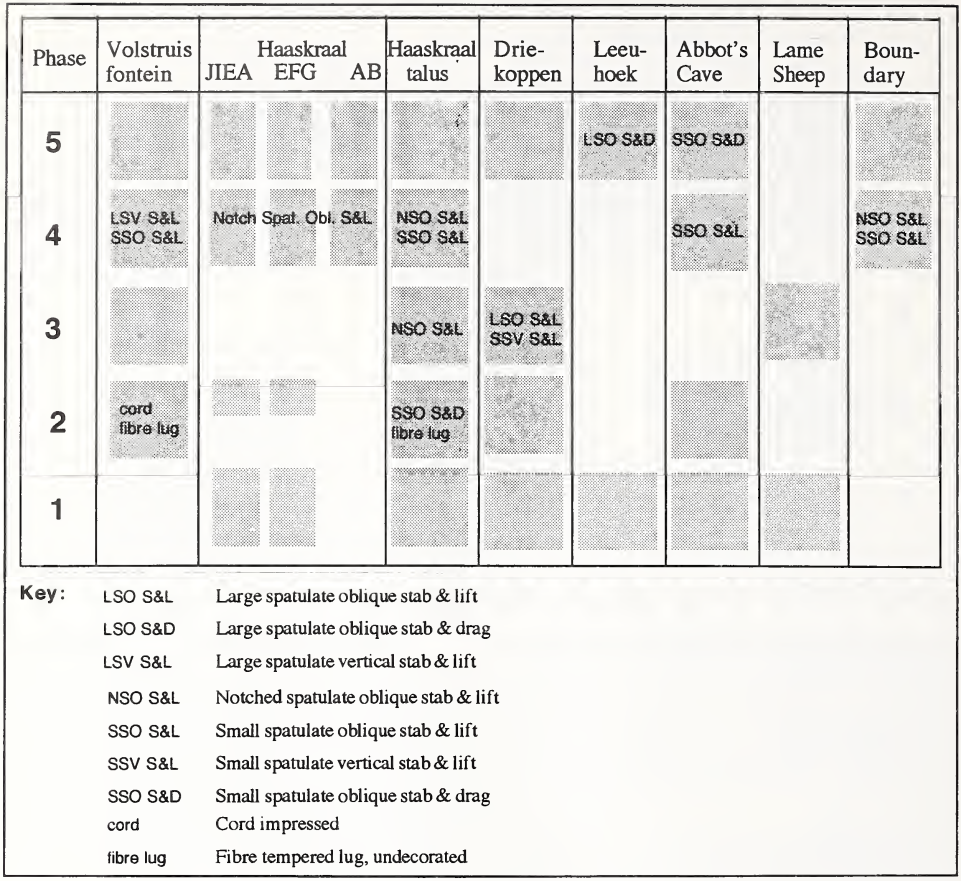

Fig. 14. Correlation chart showing stratigraphic positions of ceramic motifs not tested in the direct dating program. Motifs are described in Sampson (1988).

data as Phases 2, 4, and 5, the anticipated difficulty in discerning Phase 3 did not occur, at least on the east side of the upper valley. Overall, the ceramic stratigraphy goes some way to supporting the 5-phase framework suggested by the direct dating program.

Other Potential Markers

Decorative motifs for which there were no direct dates were repeatedly encountered in the excavated sequences, and some of those motifs recurred in the same horizon (Fig. 14).

In Phase 1 there were small crumbs with faint traces of stamp impressions on their outer surfaces, but the motif could not be recognised. These were seen at Volstruisfontein and Haaskraal. Parts of some deposits showed rocker stamp vessels at the very base of the sequence, and were assigned to Phase 2. It could be that Phase 1 included some decoration, but the question cannot be resolved without AMS dates on those specific basal sherds.

In Phase 2, fibre-tempered lugs without decorations were recovered from Volstruisfontein and Haaskraal talus. Therefore lugs were not restricted to Phase 4, for which there is a solitary direct date.

Phase 2 also yielded the very rare cord-impressed motif (at Volstruisfontein) and a possibly related pattern of small spatulate oblique stab and drag (at Haaskraal talus) If the stylus is held at an angle to the line of drag, it is possible to create an imprint that resembles single cord impression, so the two may be related.

Phase 3 is difficult to evaluate because the record of its presence is so ambiguous. Only one of the two reasonably secure Phase 3 samples (at Driekoppen) yielded undated types. These included small spatulate vertical stab and lift, also large spatulate oblique stab and lift. Securely dated as the main Phase 4 marker, this is

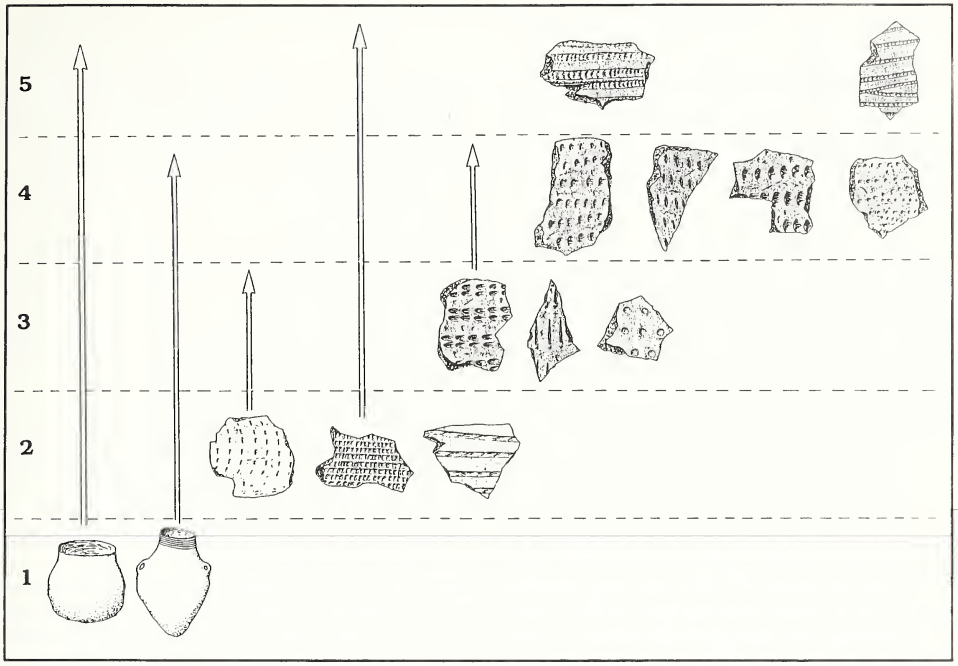

Fig. 15. Summary diagram of ceramic types and motifs present in each phase. Direct dated motifs are augmented by others found consistently in the same stratified positions.

not found in Phase 3 elsewhere. If the Driekoppen specimens were not churned downwards by the firepits dug in from above, they raise the possibility that the motif was indeed present earlier, albeit in small numbers.

Phase 4 has produced more undated potential markers, all based on the spatulate stylus. The most recurrent motif (at four sites) was the small spatulate obliquestab and lift, which differs only in spatulate tip width from the main marker type. Notched spatulate stab and lift was another recurrent pattern (in three deposits). There is also one case of large spatulate vertical stab and lift, which differs from the main marker only in the angle of entry of the stylus tip. It can also be noted that rare Khoi sherds were recovered from the Phase 4 levels of three deposits, adding support for the single TL date which suggested a dwindling Khoi survival into Phase 4 times.

Phase 5 produced large and small spatulate stab and drag motifs in two sites on the east side of the upper valley. Stab and drag is certainly present in the Post-contact levels of Glen Elliott and Zaayfontein on the Orange River (Sampson 1967a & b). It is thus reasonable to expect Phase 5 surface samples to include rare examples of stab and drag also. The Khoi sherds found in Phase 5 levels at Abbot's, Lame Sheep, and Leeuhoek are in each case associated with disturbances which suggest they are derived from lower in the sequence.

CONCLUSIONS

Overall, the ceramic stratigraphy supports the 5-phase chronological framework of ceramic markers, based on the direct dating of sherds. Although none of the excavated sequences flatly contradict the proposed framework, neither does any one shelter fill satisfactorily duplicate the whole, unbroken sequence. Either multiple, unpatterned gaps in occupation are a hallmark of all the shelters, or the five-phase framework is too simplistic as a heuristic device for the planned seriation of surface sites. However, stratified charcoal dates from three shelters definitely support the former interpretation.

More marker motifs are suggested for Phases 2, 4, and 5 than were captured in the sample used for direct dating. The combined results of the direct dating program and the excavation program (Fig. 15) suggest a substantial revision of the middle part of the sequence proposed by Sampson *et al.* (1989). Phase 1 is still represented by Khoi and undecorated fibre-tempered ware. Phase 2 heralds the introduction of rocker, comb, and cord motifs to the fibre-tempered vessels. Phase 3 sees the further addition of double punctate, quill and ovoid stab and lift motifs, but cord drops away. Phase 4 is characterised by four variants of the spatulate stab and lift family of motifs, while comb, quill and ovoid drop

out. Phase 5 is still characterised by rocker stamp with very rare occurrences of spatulate stab and drag motifs. Khoi ware drops away, as does the double punctate motifs and the four spatulate stab and lift motifs on the fibre-tempered ware.

These criteria greatly enhance our ability to seriate the large sample of surface sites based on their ceramic contents.

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FILLING A GAP: THE EARLY AND MIDDLE HOLOCENE ASSEMBLAGES FROM NEW EXCAVATIONS AT SEHONGHONG ROCK SHELTER, LESOTHO*

P. J. MITCHELL

Pitt Rivers Museum, University of Oxford, 64 Banbury Road, Oxford, OX2 6PN, United Kingdom

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ABSTRACT

Until recently the virtual lack of evidence for early or middle Holocene human activity in the Lesotho highlands created a sharp contrast with the situation in the Barkly East/Maclear area of the Eastern Cape and the lowlands of the Caledon Valley. Recent excavations at Sehonghong rock-shelter now document at least three pulses of occupation between 10 000 and 6000 BP. These pulses comprise an Oakhurst-like assemblage in the tenth millennium BP, followed by an occurrence with large numbers of Woodlot scrapers dating to c. 7000 BP and a Classic Wilton assemblage dating to c. 6000 BP. The Sehonghong sequence, which exhibits significant continuities across the Pleistocene/Holocene boundary, is at odds with models proposing that changes in raw material usage at this time were coincident with changes in blank production. Examining the distribution of ostrich eggshell beads and seashell ornaments and patterns of lithic raw material usage in southeastern southern Africa as a whole during the early/middle Holocene suggests that Sehonghong and other sites in Lesotho may not have formed part of the same exchange network as sites in the Barkly East/Maclear area or the eastern Free State.

INTRODUCTION

Previous considerations of the prehistory of the Lesotho highlands have emphasised evidence for its late Pleistocene and late Holocene occupation (*e.g.* Carter *et al.* 1988). Though more recent hunter-gatherer activity is well documented by excavations and field surveys (Carter 1978) and by numerous painted rock shelters (Vinnicombe 1976), virtually no indication has previously emerged for this region having been occupied during the early or middle Holocene. Indeed, the marked contrast between this situation and that revealed in the Caledon Valley (Mitchell 1994a) lead to the suggestion that highlands and lowlands had quite different settlement histories over the last 10 000 years (Mitchell & Vogel 1992). A similar contrast was evident with the Barkly East/Maclear area of the Eastern Cape Province where several sites were occupied in the early and/or middle Holocene (Opperman (1987). Recent excavations at Sehonghong rock shelter show this conclusion to be erroneous and that the upper Orange River witnessed at least three pulses of human settlement during the early and middle Holocene. Following earlier papers that describe assemblages from the underlying late Pleistocene layers (Mitchell 1994b, 1995), this paper reports on the artefact occurrences from the 10 - 6000 BP levels at Sehonghong. Analyses of associated botanical and faunal material will be published separately at a later stage.

BACKGROUND TO THE SITE AND ITS EXCAVATION

Sehonghong rock shelter (29.46S; 28.47E) lies on the south bank of the Sehonghong River, 3 km upstream of its confluence with the Orange (Senqu) River in the Thaba Tseka District of the eastern Lesotho highlands (Fig. 1). Details of present day climate and environment and of the procedures followed during excavation of the site in 1992 are given elsewhere (Mitchell 1994b, 1995, in press).

Stratigraphy

The natural stratigraphic units defined during the excavation (Fig. 2) were grouped, for analytical purposes, into layers that represent successive pulses of occupation. Three are of concern (Fig. 3). All come from the middle and upper portions of Layer IX of Carter's (1978) stratigraphy, described previously as a series of interlensing hearth complexes with much organic matter and abundant artefacts (Carter *et al.* 1988:36). These layers are:

> GWA (Grey White Ash): a series of quite firm white to pinkish-white ash bodies with a high charcoal content that may be the remains of several interlensing hearths. These units occur only in the rear half of the 1992 excavation trench, suggesting that

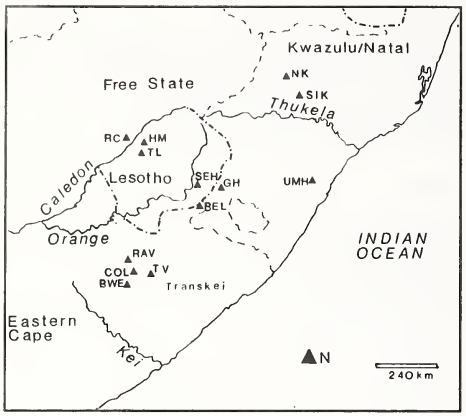

Fig. 1. Location of Sehonghong and other sites mentioned in the text. Site names abbreviated thus: BEL Belleview; BWE Bonawe; COL Colwinton; GH Good Hope; HM Ha Makotoko; NK Nkupe; RAV Ravenscraig; RC Rose Cottage Cave; SEH Sehonghong; SIK Sikhanyisweni; TL Tloutle; TV Te Vrede; UMH Umhlatuzana.

front of the excavation trench, in the rear of which firmer, white ashy units were found. The topmost units of this layer were partially calcreted and constitute a clear stratigraphic break with the bottom of ALP. SA was excavated in 24 units, including one hearth. 140 buckets of deposit were removed.

Two main sources of potential stratigraphic disturbance were noted. Firstly, the cocoons of an as yet unidentified insect were found at the extreme rear of the excavation trench through all three of the layers considered here. Their burrowing may have resulted in vertical displacement of small items. Secondly, although the vast majority of termite casts found in excavation concentrate in the 12 500 - 12 200 BP period (Mitchell 1995), a few do occur in SA, raising the possibility of further bioturbation of the deposit. However, neither of these two processes, nor the animal burrow excavated in ALP, appears to have had a major impact on the integrity of the archaeological horizons: pottery, for example, is completely absent from GWA, even though sherds occur in the layer immediately above. Four small sherds do occur in the topmost unit of ALP, but all are from the western end of the excavation trench where this unit immediately underlies the late Holocene GAP layer with its ceramic post-classic Wilton assemblage.

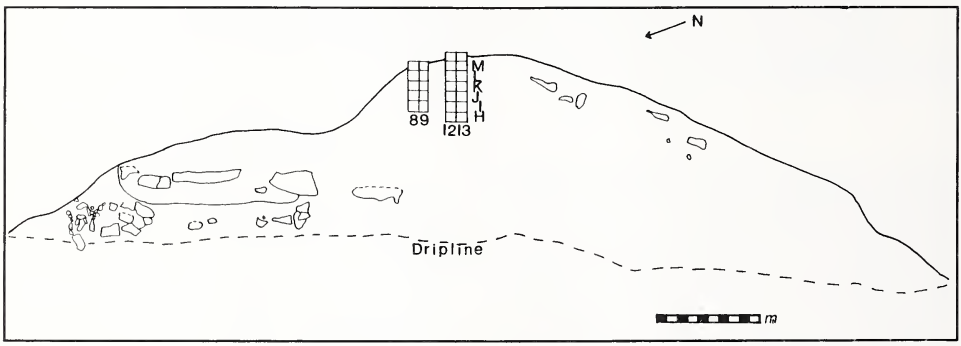

Fig. 2. Sehonghong: site plan showing location of the 1971 (squares 8 & 9) and 1992 (squares 12 & 13) excavations.

they represent a localised area of activity within the shelter. Removed in 14 units, GWA produced 83 buckets of deposit.

ALP (Ashy Loams with Plants): a series of predominantly reddish-brown or black ashy loams, many of which contain partly humified plant remains. Some units have a more distinctly ashy content, particularly toward the layer's base and in the rear of the excavation trench, where mottled pinkish-white compact ash bodies dominate. 188 buckets of deposit were removed in 39 units, including one pit and two shallow hearths.

SA (Sandy Ash): a series of mottled orange-brown sandy loams, most strongly developed toward the

Dating

Ten radiocarbon dates are relevant to the dating of the early and middle Holocene levels (Table 1), though Pta-6071 and Pta-6354 must be rejected as out of sequence. Two determinations bracket the SA layer between 9740 ± 170 BP (Pta-6057) and 9280 ± 45 BP (Pta-6368). Above this, ALP produced four closely similar dates that overlap at two standard deviations. These dates, which have a mean value of 7150 BP, indicate, along with the substantial quantity of deposit removed, that this layer represents a relatively short period of intense occupation. A radiocarbon determination of 6870 ± 60 BP (Q-3174) from the 1971 excavation of Sehonghong (Carter *et al.* 1988) probably relates to this layer. For the overlying GWA only a single date (5950 ± 70 BP, Pta-6154) has been obtained

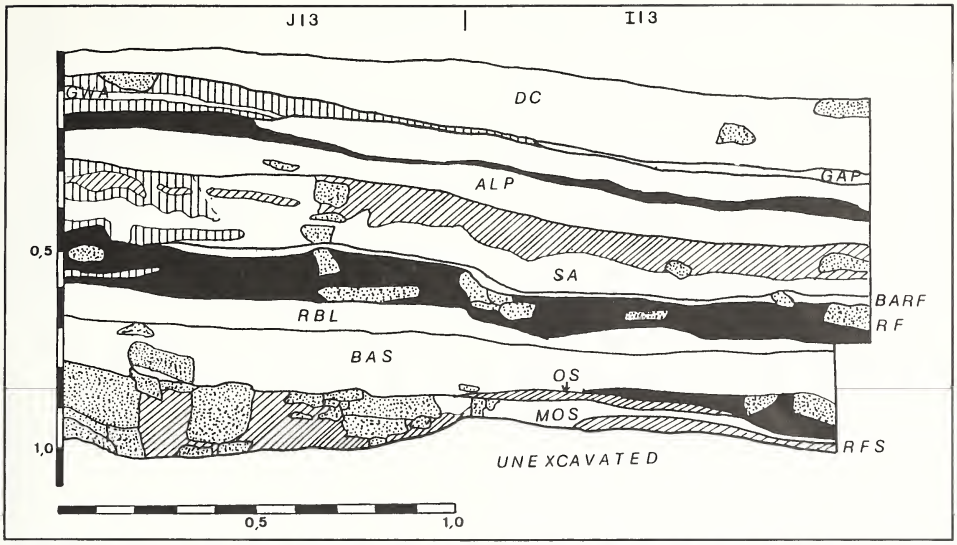

Fig. 3. Sehonghong: partial section of the north wall in the 1992 excavation. Stippling denotes rocks, black areas represent carbon-rich loams, diagonal hatching shows orange sands and vertical hatching white ash.

Table 1. Sehonghong: radiocarbon determinations for the early and middle Holocene layers.

Lab. No.	Date BP	Layer	Unit
Pta-6154	5950 ± 70	GWA	001
Q-3174	6870 ± 60	-	-
(from Layer IX of the 1971 excavation, Carter *et al.* 1988)			
Pta-6278	7150 ± 80	ALP	006
Pta-6280	7090 ± 80	ALP	014
Pta-6072	7210 ± 80	ALP	022
Pta-6083	7010 ± 70	ALP	117 (from a discrete hearth)
Pta-6071	3970 ± 30	ALP	032
Pta-6368	9280 ± 45	SA	119 (from a discrete hearth)
Pta-6354	6960 ± 40	SA	055
Pta-6057	9740 ± 140	SA	062

Note: All dates are uncalibrated and have been corrected for isotopic fractionation. All were run on charcoal, pretreated with acid and alkali. Unless otherwise indicated, samples were taken from spreads of charcoal collected from throughout a square. Pta-6071 and Pta-6354 are out of sequence and need to be rejected.

This comes from its topmost unit and for the succeeding four millennia there is no indication that the site was occupied by people; the next radiocarbon date in the Sehonghong sequence (1710 ± 20 BP, Pta-6063) comes from the base of layer GAP (Mitchell & Vogel 1994).

Features

In contrast to the late Pleistocene part of the Sehonghong sequence, few discrete features were recognised in excavation of the Holocene levels. Those identified include a small pit in the middle of ALP, two hearths toward its base, and two more hearths at the top of SA, one demarcated by two grindstones and a manuport. The outlines of a potential bedding hollow were traced in one unit in ALP, but not all of this feature fell within the excavation area. A further feature in ALP may be the remains of a large stake or posthole. Several similar stakeholes were observed in section in the 1971 excavation (Carter 1978). Comments by a local informant interviewed at that time, who recalled seeing Bushmen using 'huts' built inside the shelter, provide one explanation of the presence of these stakeholes (P. Vinnicombe, pers. comm.).

STONE ARTEFACT ASSEMBLAGES

The Sehonghong lithic assemblages were analysed using Deacon's (1984a) typology, as amended by Carter *et al.* (1988). However, complete analysis of the Holocene stone artefacts was not attempted. It was felt that little useful information was to be obtained by counting every single chip, flake and other element of débitage. Consequently, during sorting only cores, utilised artefacts and formal tools were identified and treated separately. The remaining artefacts (*i.e.* all the débitage except for the cores) were categorised by raw material and then weighed to provide a measure of changing patterns of raw material use. Blade/bladelet frequency was monitored by counting the frequency of these artefacts in four of the excavated squares (I12, J13, K12 and L13). Lack of time and manpower (or the finance to pay for it) are common

Table 2. Sehonghong: raw material usage in the early and middle Holocene layers.

	GWA		ALP		SA		Total
Entire assemblage	(g)	%	(g)	%	(g)	%	(g)
Opalines	20 215,5	82,0	26 346,5	73,7	14 172,1	67,0	60 734,1
Dolerite dyke material	3 167,2	12,9	7 441,0	20,8	4 130,3	19,5	14 738,5
Hornfels	232,1	0,9	742,2	2,1	708,4	3,4	1 682,7
Basaltic rocks	281,3	1,1	377,0	1,1	544,6	2,6	1 202,9
Quartz	226,8	0,9	296,4	0,8	652,4	3,1	1 175,6
Siltstone/mudstone	40,8	0,2	129,2	0,4	136,8	0,6	306,8
Other	489,1	2,0	419,2	1,2	816,6	3,9	1 724,9
Total	24 652,8	100,0	35 751,5	100,1	21 161,2	100,1	81 565,5
Utilised artefacts	N	%	N	%	N	%	N
Opalines	112	82,4	136	73,5	68	60,2	321
Dolerite dyke material	13	9,6	24	13,0	17	15,0	49
Hornfels	3	2,2	7	3,8	6	5,3	14
Basaltic rocks	2	1,5	9	4,9	10	8,8	18
Siltstone/mudstone	3	2,2	3	1,6	5	4,4	11
Other	3	2,2	6	3,2	7	6,2	15
Total	136	100,1	185	100,0	113	99,9	434
Formal tools	N	%	N	%	N	%	N
Opalines	351	98,9	325	97,3	18	81,8	694
Dolerite dyke material	1	0,3	2	0,6	-	-	3
Hornfels	2	0,6	5	1,5	3	13,6	10
Siltstone/mudstone	1	0,3	2	0,6	-	-	3
Other	-	-	-	1	4,6	1	1
Total	355	100,1	334	100,0	22	100,0	711

Note: Other materials include baked siltstone/mudstone, sandstone, shale and tuff.

Table 3. Sehonghong: cores and core by-products from the early and middle Holocene layers.

	GWA	ALP	SA	Total
Irregular	75	118	98	291
Bladelet	2	3	12	17
High-backed bladelet	-	2	6	8
Flat bladelet	2	1	6	9
Small bladelet	-	-	2	2
Total cores	79	124	124	327
Core-reduced pieces	1	10	9	20
Core-tablets	14	15	6	35
Lames à crête	-	-	2	2

problems in processing excavation material. The approach followed at Sehonghong may therefore prove useful elsewhere.

Table 2 shows that opalines dominate all three of the assemblages discussed, but that there is a progressive increase in their importance with time. Correspondingly, the amounts of dolerite dyke material and hornfels declined. Quartz crystal is, compared with the rest of the Sehonghong sequence, common in SA, but almost all occurs as chips, chunks and tiny flakes < 10 mm in size. Both quartz and calcite crystals, which do not fracture isotropically, may thus have been introduced to the site at least partly for something other than making stone tools, *e.g.* as part of shamanistic paraphernalia (Wadley 1987:44-46), or for use, when crushed, as a source of white pigment (Yates *et al.* 1990). Despite the diversity of rock types employed, virtually all formal tools were made in opalines in all three assemblages.

The late Pleistocene occurrences at Sehonghong are characterised by a heavy investment in the systematic production of bladelets from specialised bladelet cores (Mitchell 1995). Neither of these features is important in the Holocene part of the Sehonghong sequence, where the frequency of blades and bladelets never exceeds 4,3% of the total number of unmodified artefacts. Although a few high-backed (wedge-shaped) bladelet cores occur in SA and ALP and more generalized forms of bladelet core

Table 4. Sehonghong: utilised and formally retouched artefacts from the early and middle Holocene layers.

	GWA		ALP		SA		Total
	N	%	N	%	N	%	N
Utilised flakes	122	89,7	155	83,8	76	67,3	353
Utilised blades	7	5,1	8	4,3	14	12,4	29
Utilised bladelets	1	0,7	4	2,2	5	4,4	10
Hammerstones	1	0,7	2	1,1	1	0,9	4
Upper grindstones	2	1,5	5	2,7	5	4,4	12
Lower grindstones	-	-	2	1,1	8	7,1	10
Ochre-stained grindstone fragment	-	-	-	-	1	0,9	1
Upper grindstone/ hammerstone	-	-	1	0,5	-	-	1
Bored stone	1	0,7	-	-	-	-	1
HEFPs	-	-	5	2,7	-	-	5
Palettes	2	1,5	2	1,1	-	-	4
Ground sandstone	-	-	1	0,5	3	2,7	4
Total utilised	136	99,9	185	100,0	113	100,1	434
Scrapers	271	76,3	291	87,1	10	45,5	572
Adzes	22	6,2	14	4,2	4	18,2	40
Scraper/adze	1	0,3	-	-	-	-	1
MRPs	13	3,7	14	4,2	8	36,4	23
NBKs	-	-	3	0,9	-	-	3
Truncated flake	1	0,3	-	-	-	-	1
Retouched points	1	0,3	1	0,3	-	-	2
Pressure-flaked fragment	-	-	1	0,3	-	-	1
Borers	2	0,6	1	0,3	-	-	3
Backed microliths:							
flakes	4	9,1	2	22,2	-	-	6
blades	-	-	1	11,1	-	-	1
bladelets	3	6,8	-	-	-	-	3
points	1	2,3	1	11,1	-	-	2
segments	34	77,3	4	44,4	-	-	38
fragments	2	4,5	1	11,1	-	-	3
sub-total	44	12,4	9	2,7	-	-	53
Total retouched	355	100,1	334	100,0	22	100,1	711
Density of formal tools per bucket of excavated deposit		4,28		1,78		0,16	-

HEFP Heavy edge-flaked piece
MRP Miscellaneous retouched piece
NBK Naturally backed knife

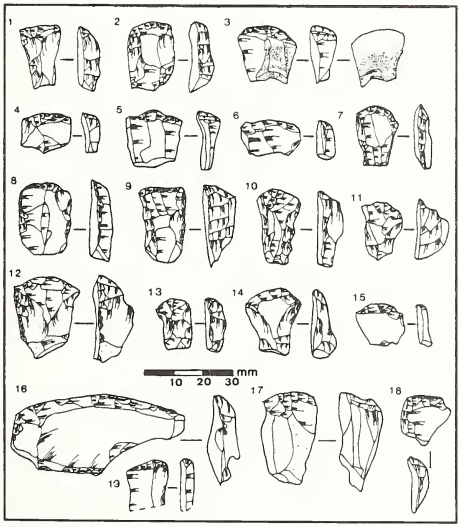

Fig. 4. Sehonghong: scrapers from the early and middle Holocene layers. All in opalines. 1-7 GWA; 8-15 ALP; 16-19 SA. Dense stippling denotes mastic. Numbers 1, 2, 7-10 and 12-14 have adze-like lateral retouch.

in all three layers, by far the majority of cores are irregular, with single platform types most common. Bipolar flaking is rare, though rather more common in SA, partly because all of the very few quartz cores present in the assemblages discussed here (N = 3) occur in that layer. The other examples of such cores are all in opalines, but a bipolar technique was obviously not generally needed for the reduction of this material.

Most of the utilised artefacts found are flakes (Table 4), the majority falling within Deacon's (1984a) edge-damaged category. Utilised blades and bladelets are uncommon compared to the underlying Robberg-like assemblages. Several whole and broken upper and lower grindstones were found and one fragment is ochre-stained. Rarer items include an unfinished bored stone from GWA and four ground stone palettes, two from GWA and two from ALP. Three are in shale, with the other in the sandstone usually employed for such items at Lesotho sites. The function of these objects remains unknown (Clark 1959); despite the name, none is ochre-stained. A possibly backed flake in ALP and two scrapers and an unmodifed flake from GWA are the only artefacts bearing traces of mastic that were found in the early/middle Holocene layers.

Though present in the SA assemblage, formal tools are more frequent after 7200 BP and still more so c. 6000 BP (Table 4). Scrapers (Fig. 4) are by far the most common class present and several artefacts classified under miscellaneous retouch probably belong with them. The SA scrapers resemble their late Pleistocene predecessors in showing little standardization of design, though they are rather larger, particularly in mean width. Greater formality is evident in those from ALP and GWA, some 80 % of which have scraper retouch present only at the distal end of endstruck flakes. Slightly more than half also have steep adze-like retouch down one, or more commonly both, lateral margins. In rare cases this retouch has been applied to the ventral, rather than the dorsal, surface of the artefact and, particularly in ALP, the bulb of percussion may be removed. Opperman (1987) intepret this kind of retouch as a way of facilitating hafting in an end-mounting technique, rather than the side-mounting technique suggested for later Holocene scrapers (Deacon & Deacon 1980). If scrapers were now regularly hafted in a consistent manner then this should have imposed constraints on scraper size: metric data show that scrapers from ALP and GWA display much less variability in width than those from SA (Table 5).

Backed microliths occur only rarely in the Robberg-like assemblages at Sehonghong and not at all in SA. Segments appear for the first time around 7200 BP, but are only common in GWA (Fig. 5). Rare examples of other backed microlith types are also present in both ALP and GWA. Adzes are the other principal formal tool class present (Fig. 6) and the use of side-struck flakes as blanks for adze manufacture seems distinctive of the 7200 - 6000 BP part of the Sehonghong sequence. Adze notch width was measured, giving a mean value for GWA of 19,00 ± 6,91 mm (N = 16). This is closely comparable to values reported from Hololo Crossing in north-western

Table 5. Sehonghong: descriptive statistics (mm) for opaline scrapers from the early and middle Holocene layers.

	GWA	ALP	SA
Length	23,20 ± 7,08	24,32 ± 6,31	25,89 ± 5,53
Width	19,13 ± 4,55	18,42 ± 4,39	27,00 ± 13,18
Thickness	7,97 ± 2,85	8,56 ± 3,20	8,78 ± 3,52
Height of retouch	6,50 ± 2,46	6,86 ± 2,82	7,78 ± 3,71
N	234	237	9

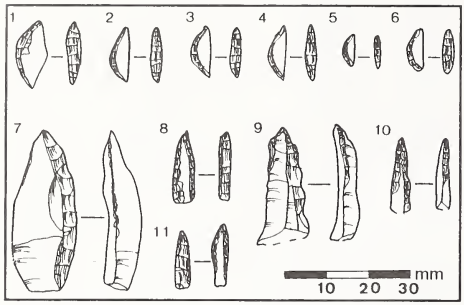

Fig. 5. Sehonghong: backed microliths from the early and middle Holocene layers. All in opalines. 1-5 segments (GWA); 6 segment (ALP); 7 backed flake (GWA); 8-9 backed bladelets (GWA); 9 borer (ALP); 10 backed point (ALP).

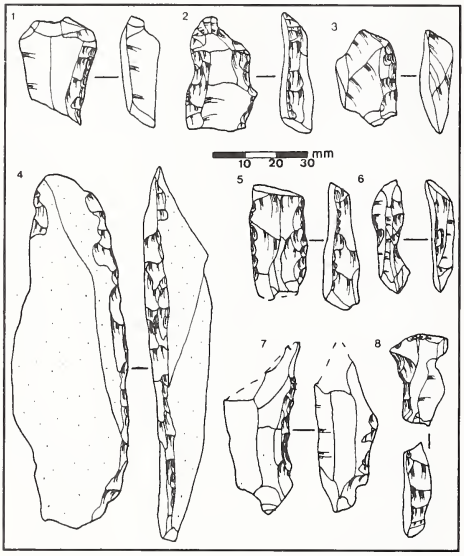

Fig. 6. Sehonghong: adzes and naturally backed knives from the early and middle Holocene layers. All in opalines unless otherwise stated. 1-3 adzes (GWA); 4 naturally backed knife (ALP, hornfels); 5-7 adzes (ALP; 7 siltstone/mudstone); 8 adze (SA).

Lesotho (Mitchell & Parkington 1990) and some sites in the Thukela Basin of KwaZulu-Natal (Mazel 1984, 1988a), suggesting a degree of consistency through time and space in the minimum sizes of artefacts worked with

Table 6. Sehonghong: pigments found in the early and middle Holocene layers.

	GWA	ALP	SA	Total
Ochre (g)	165,8	285,4	146,2	597,4
Ochreous shale (g)	-	-	7,6	7,6
Ilmenite (g)	-	0,8	3,9	4,7
Ground ochre (Number of pieces)	-	12	3	15
Ground ilmenite (Number of pieces)	-	1	-	1

adzes. One adze from GWA might be better classed as a naturally backed knife (*sensu* Parkington 1984), given the style of its retouch and cortical backing; three unequivocal examples of this type come from ALP.

A few Middle Stone Age artefacts were found in both GWA and ALP, mostly large blades with faceted platforms made from dolerite dyke material. None has evidence of re-use, but neither do they cluster with other 'strange' items, as in the 'shaman's toolkit' from Jubilee Shelter (Wadley 1987); perhaps they were picked up as curiosities from the talus or from some of the many surface scatters in the general area of the site (Mitchell 1994c). Among other manuports introduced to the site, a piece of rippled sandstone in SA may derive from the floor of a rock-shelter a few kilometres further upstream along the Sehonghong River.

PIGMENTS

Several different kinds of pigment were found, including red and yellow ochres, a small quantity of powdered red ochre in some of the ALP units and a few pieces of ground ochre in both ALP and SA (Table 6). However, very few artefacts are ochre-stained: an unmodified opaline flake from GWA, a sandstone flake from ALP and a grindstone fragment from SA.

Of particular interest is the presence of small fragments of ilmenite (one of them ground). This yields a black pigment, much used in the nineteenth century as a hair cosmetic, and occurs at several locations in northern and western Lesotho (Arbousset 1991:171), as well as near a village on the other side of the Orange River from Sehonghong. In Lesotho it is otherwise reported archaeologically only from sites in the Phuthiatsana ea Thaba Bosiu Basin, again principally in early Holocene contexts (Mitchell 1993a, 1993b). Also time-related in the Sehonghong sequence is the presence of ochreous shale, a small quantity of which occurs in SA; this is otherwise known only in the terminal Pleistocene (Mitchell 1995).

Twenty-one ochre-stained sandstone spalls bearing possible traces of paint (a possibility raised by the exfoliated nature of the spalls and the paucity of ochre-stained sandstone artefacts in the excavation from which they might otherwise derive) were recovered from GWA. Of those most strongly marked, six are red and one orange, with white and pinkish-white predominating among the rest. Given the closeness of GWA to the contemporary surface of the deposit and the evidence of insect activity in this part of the sequence, it is impossible to be certain that these spalls (all $\leq$39 mm in maximum dimension) have not worked their way into GWA from above. They should not therefore be used as

Table 7. Sehonghong: worked bone from the early and middle Holocene layers.

	GWA	ALP	SA	Total
Point - complete	1	-	-	1
Point - tip only	2	-	3	5
Midsection (point or linkshaft ?)	27	9	2	38
Butt (point or linkshaft ?)	-	-	1	1
Polished shaft fragment	2	-	2	4
Polished, flat longbone shaft fragment	2	1	-	3
Polished fragment	2	-	1	3
Bead	2	5	-	7
Total	38	15	9	62

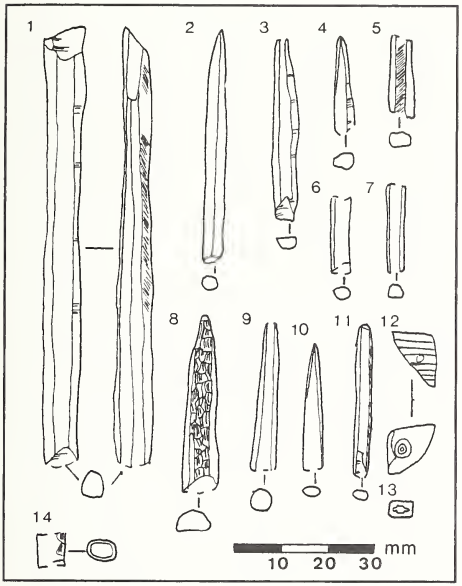

Fig. 7. Sehonghong: worked bone, shell and ostrich eggshell artefacts from the early and middle Holocene layers. 1 polished longbone shaft fragment (GWA); 2 bone point (GWA); 3 polished fragment (GWA); 4 tip (GWA); 5-7 midsections (GWA); 8 facetted and polished longbone shaft fragment (ALP); 9 midsection (ALP); 10-11 points (SA); 12 Drilled piece of *Trachycardium* sp. shell (GWA); 13 rectangular ostrich eggshell bead (GWA); 14 bone bead (GWA).

evidence of a mid-Holocene antiquity for the practice of painting rock-shelter walls.

WORKED BONE, OSTRICH EGGSHELL AND SHELL

Worked bone artefacts were found in all three layers (Table 7, Fig. 7). Most are polished mid-sections of what were probably points and/or linkshafts, similar in size and shape to probable point/linkshaft fragments from the late Holocene assemblages at Sehonghong. The butt of one point and tips from several more were also found, along with a complete point with sawn-off base in GWA. In addition to a few polished fragments of bone, some of which carry cutmarks, several bone beads (one unfinished and made from bird bone) were recovered. Another distinctive artefact, found only in GWA and ALP at Sehonghong, is represented by fragments of the shafts of bovid longbones, one surface of which is highly polished, flat and very smooth. Two of these objects also have rather crudely shaped blunt points at one end, suggesting that they could have been used as awls, but the intense polishing may indicate some other activity (related to scraping ?) as their primary function.

Ostrich eggshell (OES) beads are abundant in the Holocene part of the Sehonghong sequence, though less common in SA (Table 8). Their increased frequency, as well as that of the marine shell ornaments discussed below, parallels a general southern African trend after 12 000 BP that may signal the development of social relations, including *hxaro* exchange, comparable to those of modern San (Wadley 1993). One of the SA beads is encrusted with red ochre and another from GWA is ochre-stained. Two others from GWA are peculiar in being virtually rectangular in shape (Fig. 7). Almost all the beads (>96 %) are finished and there is no indication in any part of the Sehonghong sequence for OES beadmaking having taken place on-site. This is consistent with the unavailability of ostriches in the Lesotho highlands (Maclean 1984) and points to beads having been introduced, perhaps through long distance exchange networks, in a ready-to-wear fashion. Unworked pieces of OES are, as might be expected, also rare at Sehonghong. The quantity recovered even from GWA, where they are comparatively common, comes nowhere near that of even a single egg.

Whole OES beads were measured and comparisons drawn with similar data from Elands Bay Cave. Bearing in mind the larger (3,0 mm) mesh employed at Elands Bay, the Sehonghong data nevertheless appear to confirm the tendency seen there (R. Yates, pers. comm.) for late Pleistocene beads to be significantly larger (in both overall diameter and size of aperture) than those from the early and mid-Holocene. They also show a trend toward decreasing mean bead diameter through the period 9800 - 6000 BP (Table 8).

Except for a single *Nerita* sp. pendant dating to 12 200 BP, marine shell only occurs in the Holocene part of the Sehonghong sequence. Further temporal patterning is indicated by the fact that 95 % of the seashells found in the 1992 season come from the three layers discussed here. Though almost all are beads made from the estuarine species *Nassarius kraussianus*, two shell fragments of *Trachycardium* sp. were found in SA and two further drilled pieces of this marine genus in GWA (Table 9; Fig. 7). All these shells must have been derived from the Indian Ocean coast and may point to exchange/ alliance networks between people living in the Lesotho highlands and those living in coastal parts of south-eastern southern Africa.

DISCUSSION

A more thorough-going discussion of how early and middle Holocene foragers used Sehonghong and its

Table 8. Sehonghong: ostrich eggshell beads and pieces from the early and middle Holocene layers.

	GWA	ALP	SA	Total
OES beads (finished)	105	171	40	316
OES beads (unfinished)	2	6	3	11
OES beads (total)	107	177	43	327
Number of beads measured	104	174	40	318
Mean bead diameter (mm)	3,73 ± 0,58	3,93 ± 0,58	4,19 ± 0,67	
Mean aperture diameter (mm)	1,57 ± 0,33	1,59 ± 0,33	1,52 ± 0,31	
OES pieces (number)	14	1	-	15
OES pieces (g)	2,7	0,4	-	3,1

Table 9. Sehonghong: worked marine shell from the early and middle Holocene layers.

	GWA	ALP	SA	Total
Nassarius kraussianus beads	12	36	11	59
Trachycardium sp. pieces	-	-	2	2
Trachycardium sp. (drilled piece)	2	-	-	2

environs will be possible when results of on-going palaeoenvironmental and archaeozoological analyses can be integrated with the patterning already evident in the artefact assemblages. At this preliminary stage, three main areas of discussion present themselves: regional settlement history, comparison with early and middle Holocene lithic industries in neighbouring parts of southern Africa, and implications for the study of inter-regional exchange networks.

The earlier view (Mitchell & Vogel 1992) that the Lesotho highlands were effectively unoccupied during the early and middle Holocene is clearly in error. Though a mid-Holocene date was previously known from Sehonghong, analysis of the artefact assemblages found during the 1971 excavation was constrained by the fact that the site had been excavated in 100 mm thick spits. Concentration in that study on those spits thought to be of high stratigraphic integrity resulted in evidence for early/middle Holocene activity at the site passing unremarked between late Pleistocene and late Holocene occupations (Carter *et al.* 1988). It is now clear that people were present in Sehonghong (and thus the Lesotho highlands) during the period 10 - 6000 BP. However, the Sehonghong sequence also suggests that this occupation was far from continuous. Instead, it took the form of three distinct pulses, one bracketed by dates of 9740 and 9280 BP, the second around 7200/7000 BP and the third around 6000 years ago. Such pulsing is increasingly seen as characteristic of rock shelter occupations in southern Africa (Parkington 1990, 1992). It poses a major explanatory challenge to archaeologists, particularly when pulses of similar age are evident at sites in different parts of the sub-continent. In broad terms the Sehonghong pulses are similar to those evident in western Lesotho (Mitchell 1994a) and at Rose Cottage Cave on the opposite side of the Caledon River (Wadley & Vogel 1991).

Palaeoenvironmental observations provide one point of departure for explaining these occupation pulses since we expect climatic changes to impact on the availability of plant, animal and other resources. In the Caledon Valley, for example, the cessation of occupation evidence c. 8400 BP corresponds closely to the onset of much drier conditions (Esterhuysen & Mitchell, in press), which may have persisted until at least 7000 BP. More humid climatic phases, as between 10 000 and 8400 BP or from 6900 to 6000 BP, witnessed occupation at several rock shelters up and down the valley (Esterhuysen & Mitchell, in press). It is tempting to relate pulsing in the Sehonghong sequence to these same climatic phases, but several caveats are in order. Firstly, the Caledon Valley is in a more ecotonal situation than the upper Orange River (Wadley *et al.* 1992), so conditions may not have been precisely the same. Second, the few palaeoenvironmental data available from the Lesotho highlands suggest only that relatively moist conditions were present from around 7200 BP, judging from the onset then of peat formation in the catchment of the upper Mashai River (Carter 1978). In developing palaeoclimatic inferences we need to expand our use of such off-site data and thus avoid an exclusive reliance on the botanical and faunal assemblages associated with human activities at archaeological sites. Third, our understanding of the impact of climatic change on the availability of key subsistence resources is inadequate and requires refinement. Lastly, we must avoid the temptation of assuming that pulsing in rock shelter sequences necessarily implies pulsing in regional occupation, as opposed to pulsing in shelter use. This point, made in a recent study of western Lesotho (Mitchell *et al.* 1994), receives added emphasis from the discovery near Sehonghong of an open-air archaeological site of with possible early/middle Holocene occupation (Mitchell 1994c).

In general terms the early/middle Holocene assemblages from Sehonghong fit the broad southern African pattern: the SA assemblage with its extreme rarity of formal tools of any kind or of bladelet production can be assigned to the Oakhurst Complex, while GWA with its many segments and smaller scrapers belongs to the Classic phase of the Interior Wilton Industry (Sampson 1974; Deacon 1984b). ALP is best thought of as an earlier expression of the Wilton tradition, comparable to the contemporary CSL-LR occurrence at Tloutle in western Lesotho (Mitchell 1993b). The informality of the SA assemblage is paralleled in assemblages from Te Vrede (Layers 3 and 4) and Ravenscraig (Layer 4) in the Barkly East/Maclear area of the Eastern Cape Province, which date to about 10 000 BP (Opperman 1987). Similarly, scrapers with adze-like lateral retouch are characteristic of the period after 8000 BP at both these sites and at Colwinton and Bonawe (Opperman 1987). They are also distinctive of sites in central western Lesotho from c. 9300 to 6900 BP (Mitchell 1994a) and can be found towards the base of sequences at Liphofung (Kaplan 1992) and Masitise (Mitchell *et al.* 1994) at the northern and southern ends of the Caledon Valley. Recently termed 'Woodlot scrapers', after an open air site in southern Lesotho (Mitchell *et al.* 1994), they form a distinctive aspect of the more widespread 'duckbill scraper' phenomenon noted by Goodwin & Van Riet Lowe (1929) and Deacon (1984b). Interestingly, the ALP and GWA assemblages

from Sehonghong feature large numbers of these scrapers, while they are quite rare in contemporary assemblages from Tloutle in western Lesotho (Mitchell 1993b). If one opts for a 'traditional' model of culture that equates assemblage similarity and shared cultural traditions (but *cf.* Binford 1962; Hodder 1982), then this divergence in stone-working traditions could imply that contact between communities in eastern and western Lesotho lessened in the middle Holocene. The continued presence of ostrich eggshell beads and pieces in ALP and GWA at Sehonghong, which probably have a westerly origin (see below) suggests, however, that such a normative explanation may not be appropriate in this case.

As yet no observations comparable to those from Sehonghong are available elsewhere in the Lesotho highlands, though Belleview, just across the border into the Eastern Cape Province of South Africa, has a radiocarbon date of 8650 ± 80 BP (Pta-359) (Carter & Vogel 1974). This site's assemblages remain unanalysed in detail, but 'Oakhurst' artefacts may be present (Carter 1969). The assemblage from Layer 3 at Good Hope Shelter dates to 7670 BP and includes several Woodlot scrapers (Cable *et al.* 1980:14), along with larger, convex scrapers that suggest an affiliation to the Oakhurst Complex. Elsewhere in KwaZulu-Natal, the 9700/10 000 BP assemblage from Sikhanyisweni more closely parallels that from SA in its extreme scarcity of formal tools (Mazel 1988a), while segment-rich assemblages comparable to GWA are known at sites such as Nkupe (Mazel 1988b). The Layer 4 assemblage from Umhlatuzana has been described as 'Robberg-like' (Kaplan 1990) and, like the Swaziland site of Siphiso Shelter (Barham 1989), has a much stronger bladelet emphasis than the contemporary SA assemblage at Sehonghong. These observations support the view that bladelet-rich technologies persisted rather longer in southeastern southern Africa than elsewhere in the sub-continent (Mitchell 1995:36), but may additionally indicate an interesting, and potentially informative, degree of variability between sites within this region. At Umhlatuzana, just as at Sehonghong, the presence of naturally backed knives in both late Pleistocene and early Holocene contexts also raises the question of continuity in stone-working traditions across the Pleistocene/Holocene boundary (Kaplan 1990:86).

Observations from Sehonghong contribute further to this suggestion that patterns of technological change from the late Pleistocene into the middle Holocene were more complex than previously thought. In particular, they cast doubt on the effectiveness of explanations relating changes in raw material usage to those in the organisation of stone tool technology since the two can be shown to have proceeded here independently of each other. Specifically, not only were opalines always the most common rock type used by Later Stone Age (LSA) hunter-gatherers at Sehonghong, but the use of coarser materials peaked in occupation pulses dating 12 200 and 11 000 BP when stone tool technology was still geared to production of large numbers of unmodified bladelets (Mitchell 1995). Contrary to what has been argued for the Eastern and Western Cape (*e.g.* Deacon 1984a; Ambrose & Lorenz 1990), changes in raw material usage and blank production did not go hand-in-hand at Sehonghong. Further evidence for continuity as much as change between the early Holocene and the late Pleistocene lies in the use of naturally backed knives as late as 7000 BP and the extreme rarity of formal tools in both the Robberg and all those Lesotho assemblages dating between 12 000 and 9500 BP (Mitchell 1993a). Indeed, looked at from the point of view of the activities that people may have undertaken at the Sehonghong site, its greater variety of pigments, higher density of grindstones and overall expediency of stone artefact manufacture group SA with the late Pleistocene horizons, even though the very much lower numbers of bladelets and bladelet cores make it impossible to see SA as 'Robberg-like.' In this respect similarities become evident between Sehonghong and a site such as Elands Bay Cave and perhaps a 'historical narrative' approach (Parkington 1993), rather than one structured in terms of successive industries, will also prove the most useful way of looking at the Lesotho sequences.

A final point raised by the early/middle Holocene assemblages at Sehonghong concerns the suitability of southeastern southern Africa for the investigation of prehistoric interaction networks (Mitchell 1996). Distributions of ostrich eggshell and seashell beads in the early and middle Holocene suggest that people using the Barkly East/Maclear area (Opperman 1987) and Rose Cottage (L. Wadley, pers. comm.) did not participate in the same inland-coast exchange network as those making use of Sehonghong, with its many seashell ornaments. Three *N. kraussianus* shells from early Holocene levels at Ha Makotoko (Mitchell 1993a) do, however, point to a connection between eastern and western Lesotho at this time. This is substantiated by the contemporary presence of ilmenite at sites in both areas and of ostrich eggshell beads at Sehonghong. Given the natural distribution of the ostrich (Maclean 1984), these beads must have come broadly from the west and the extreme rarity of beads at sites in the Barkly East/Maclear area (Opperman 1987) suggests that their source may have been the Caledon Valley (where bead-making is well-attested and ostriches were present (Mitchell 1994a; Plug 1993)), rather than the eastern edge of the Karoo; the Harrismith/Bethlehem area (an alternative potential source for ostrich eggshell) remains archaeological *terra incognita* for this period. These regional contrasts are supported by different patterns of raw material usage, despite a similar availability of rock types. Early Holocene assemblages from western Lesotho are opaline dominated (Mitchell 1994a), whereas people at Rose Cottage made extensive use of larger, coarse-grained rocks (Wadley & Vogel 1991). Similarly, the Sehonghong assemblages, as well as those from Sikhanyisweni (Mazel 1989), are opaline dominated, while those from Opperman's (1987) sites have at least as much hornfels as opalines. The congruence between these different lines of evidence points to these areas having formed fairly self-contained areas of exchange and interaction. Though technological innovations such as scrapers with adze-like lateral retouch

and, later on, segments, came to be used across these zones, different choices in stone raw material use and personal ornamentation (seashell or OES beads) may have signalled differences in social identity, perhaps at the level of dialectically or linguistically different groups (*cf.* Deacon 1976; Weissner 1983; Deacon 1986). Increased concern for the recognition of such groups can, as Mazel (1989) indicates, provide a basis on which to develop more of a 'people-to-people' view of prehistory, alongside the 'people-to-nature' questions that dominated earlier generations of LSA research.

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PRELIMINARY REPORT ON THE INVESTIGATIONS AT KULUBELE, AN EARLY IRON AGE FARMING SETTLEMENT IN THE GREAT KEI RIVER VALLEY, EASTERN CAPE*

JOHAN BINNEMAN

Department of Archaeology, Albany Museum, Grahamstown, 6139

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ABSTRACT

This paper reports on recent excavations at Kulubele, an early farming settlement in the Great Kei River valley. The site is radiocarbon dated to the 8th and 9th centuries AD. The ceramic finds are typologically similar to those associated with the Msuluzi phase in KwaZulu-Natal and northern Transkei. Iron slag and tuyere fragments are abundant and indicate that iron-working took place at the settlement. Other cultural material retrieved from the site include a flat iron point, iron beads, shell and ostrich eggshell beads, marine shell ornaments, stone artifacts, bone points and fragments of broken figurines. Evidence of structures were found in the form of reed/stick-impressed daga and a small portion of a daga floor, possibly a hut floor. The faunal remains comprised mainly sheep. Although the project is still in an early phase it would appear that the data from Kulubele confirm much of what is known about early farming settlements in KwaZulu-Natal and northern Transkei.

INTRODUCTION

The region south-west of the Great Kei River represents the most southerly distribution of the Nguni-speaking people. Today AmaXhosa compose the majority of the people in the region. We know, however, from historical records that these people were living in permanent settlements close to the Sunday's River in approximately 1789 (see Peires 1981; Maclennan 1986). Until recently virtually no research has been conducted into the origins, settlement and socio-economic past of Early Iron Age farming communities in this region. It is therefore not surprising that some historians have been of the opinion that Bantu people were recent settlers to the eastern Cape (see Hall 1992). Archaeologists have presented evidence and argued against such an assumption based on finds of Early Iron Age ceramics along the Transkei and Ciskei coasts[1] (Rudner 1968; Derricourt 1977; Maggs 1980b; Cronin 1982; Feely 1987). The isolated finds from the Ciskei and Alexandria coasts, however, were associated with Late Stone Age pastoralist pottery and therefore do not suggest permanent settlement by Early Iron Age farming communities (Webley & Binneman 1992). Maggs (1980a) suggests that the Chalumna River (Derricourt 1977) along the Ciskei coast is the most southerly limit of Early Iron Age settlement. Although I would agree with Maggs, we still lack convincing evidence. Since Chalumna River is only dated to ca AD 1390 (Pta-932) and none of the potsherds were decorated, it would appear that this site was not occupied by Early Iron Age people (Webley & Binneman 1992). Recently, a large surface collection of Early Iron Age ceramics was made near East London (Nogwaza 1994). However, no *in situ* features were found, nor were the ceramics directly dated. Nevertheless this find probably represents the most southerly evidence of an Early Iron Age settlement in southern Africa.

During the past two decades, archaeologists have systematically researched the history of Early Iron Age farming communities in KwaZulu-Natal. Their work resulted in well-established chronological and typological framework and settlement and economic patterns for the period between AD 650 and AD 1000 (Maggs & Michael 1976; Maggs 1980, 1984; Van Schalkwyk 1991, 1994a, 1994b; Loubser 1993; Whitelaw 1993, 1994). This relatively short period has been divided into three different ceramic phases based on vessel profile, decoration motif and decoration placement. These phases are known as Msuluzi (AD 650-790), Ndondondwane (AD 790-900) and Ntshekane (AD 890-1080) (all calibrated). Recent research north of Umtata in Transkei (Prins 1993; Prins & Granger 1993) identified two phases, Ntsitsana/ Msuluzi (AD 779) and Ntsitsana/

1. References to the former Transkei and Ciskei were retained for geographical orientation and discussion.

Ndondondwane (AD 896) (both calibrated). Further to the south, Cronin (1982) reported dates of AD 640 and AD 720 (calibrated to AD 769 and AD 874) from an Early Iron Age shell midden at Mpame River Mouth along the Transkei coast.

THE SITE

Kulubele (27.51S; 32.25E) is situated on the west bank of the Great Kei River valley in the Stutterheim district near the town of Komga in the Eastern Cape Province (Fig. 1). The site is located some 200 m below the plateau and 60 km inland from the coast. It was discovered during the late 1980's by Victor Biggs, a local farmer, who found decorated potsherds on the edge of a erosion donga (Binneman *et al.*). During a visit in 1992 with Tom Huffman and Simon Hall from the University of the Witwatersrand, several pits and a dung lens were found exposed in the side of the same erosion donga. Investigations between 1993-5 have been on a small scale and include the excavation of two pits and ten square metres of a midden as well as the exposure of two square metres of a daga floor.

EXCAVATIONS

The large donga which cuts through the southern end of the site as well as the erosion of its sides appears to have destroyed a large and important part of the settlement. Apart from the pits exposed in the side of the donga and some material scattered in isolated locations along the edge, no other exposure of material was visible. A number of pits were dug in the adjacent field to find the extent of the settlement.

Storage pits

Pit 1 was exposed in the side of a large donga and was filled with a large number of potsherds. A scatter of broken cobble stones marked the top. The pit was 1,0 m deep and 84 cm in diameter at the top, tapering down to 60 cm near the bottom. The bottom of the pit was flat rather than concave. Little stratigraphy was visible in the brown sandy fill except for the bottom 0,40 m which consisted of a grey/white ashy soil. As a control the remains were removed in 20 cm units. The topmost unit consisted of loose soil followed by a thick layer of broken potsherds. The remainder of the fill contained few sherds. The bulk of the sherds was recovered from the eroded side of the pit which meant that some of the contents have been lost and washed down the slope. The opposite wall-side contained virtually no sherds. Other cultural material included stone flakes, shell beads and a fresh water mussel pendant. Little bone was recovered. Charcoal collected near the bottom of the pit was radiocarbon dated to 1250 $\pm$ 40 BP (Pta-5865) calibrated to AD 779- **823, 827, 857**-883 (central intercepts in bold).

Pit 2 was situated in the vertical bank of the Kulubele River and was virtually completely washed out with only a few sherds remaining in the side of the donga. The bottom of the pit was 2,80 m below the surface and the depth of the opening is unknown. A fine gravel layer some 90 cm from the surface may indicate the original surface from where the pit was dug. A lens of charcoal 1,80 m from the surface marked the start of the bottom section of the pit. The pit was 47 cm in diameter at this point. The bottom of the pit was concave and filled with fine, soft white ashy soil with occasional potsherds.

Midden excavation

Ten square metres have been excavated in a midden some 100 m from the edge of the donga in an adjacent field. The deposit was between 45 cm and 15 cm deep. The surface unit comprised 15 cm of dark-grey soil which had been disturbed by ploughing. The soil underlying the plough zone was slightly more red/orange-brown overlying a soft grey/white ashy soil. The ceramics from all three units were very fragmentary. A radiocarbon date of 1270 $\pm$ 50 BP (Pta-6982) calibrated to AD 717-737; 762-**790-879** (central intercept in bold) has been obtained from the bottom of the grey ash.

Daga floor excavation

A test pit dug some 50 m from the midden excavation exposed a daga floor approximately 70 cm below the surface. The full extent of the floor is not known because only 2 square metres have been excavated. A thin lens of archaeological material rich in ceramics and bone was situated 20 cm above the floor. The ceramics from this lens can be attributed to the Msuluzi phase.

CULTURAL REMAINS

Ceramics: pots and bowls

A small number of decorated potsherds were recovered from the pit whereas a relatively large sample came from the midden excavation. The assemblage, however, was fragmentary and large pot fragments in general were broken at the neck/shoulder junction which made it difficult to establish the extent of shoulder and body decoration. The majority of vessels were decorated only on the rim and occasionally on the lip and the inside of the rim. Only a few decorated body fragments were found which indicate that shoulder and body decoration occurred less frequently. The most common band motifs were hatching, cross-hatching (even and unevenly spaced), herringbone and alternating triangles. The incisions range from heavy, deep, rough U- and V-shaped incisions to carefully executed, shallow U- and V-shaped incisions.

The ceramic assemblege at Kulubele was divided into 17 classes (including undecorated vessels) using vessel profile, decoration placement and decoration following Huffman 1980. The following classes were identified:

1. Pot with an everted neck with a band of decoration on the rim and pendant motifs on the shoulder (Fig. 2.1).
2. Pot with an everted neck with a band of decoration on the rim and a band inside the neck (Fig. 2.2).

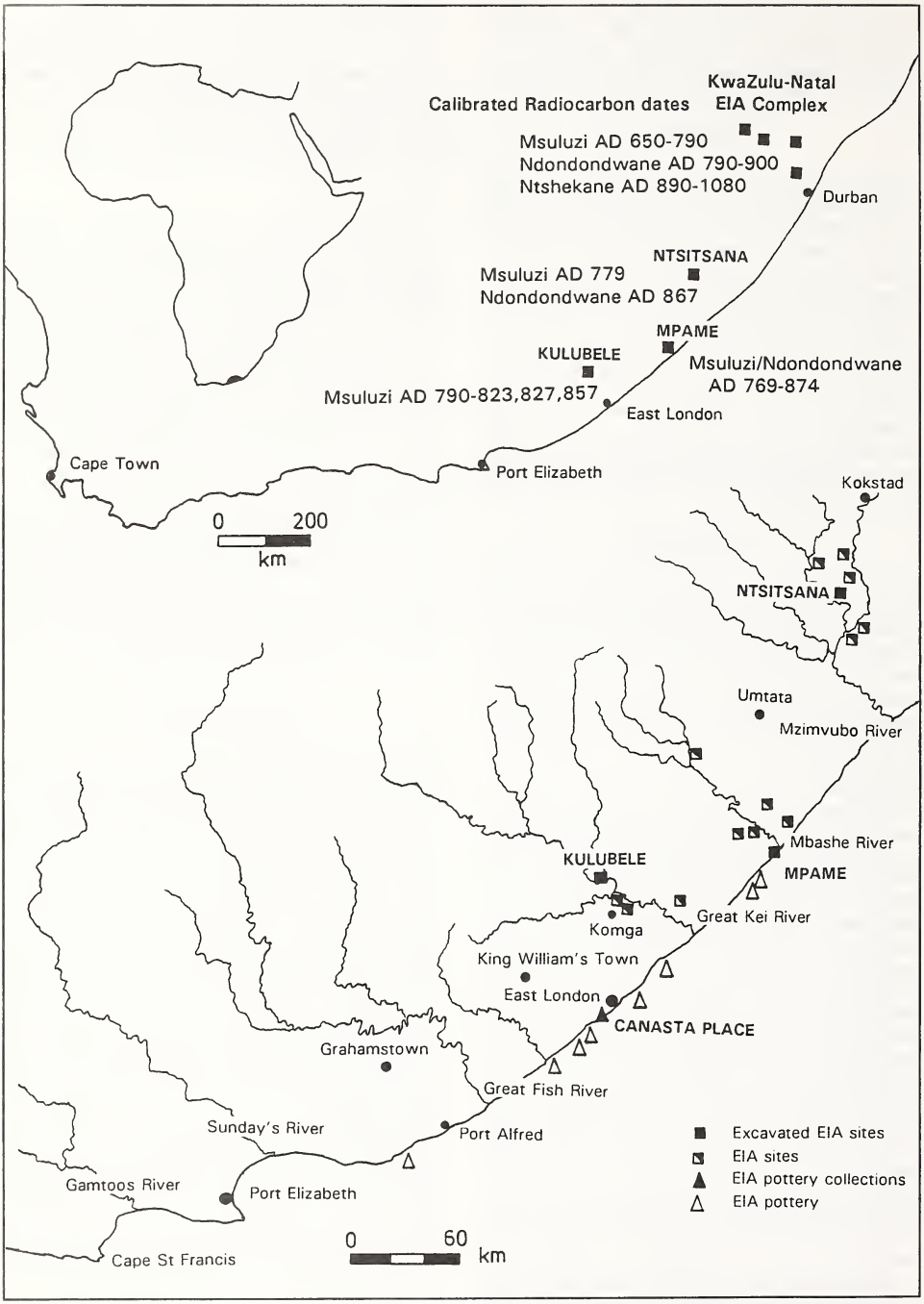

Fig.1. Location of Kulubele and radiocarbon dates for EIA sites in KwaZulu-Natal and Eastern Cape regions.

Note: This class consists of small fragments only and although the full extent of the decoration cannot be established, it is considered sufficient evidence for an independant class.

3. Pot with an everted neck with a band of decoration on the rim and a band on the neck (Fig. 2.3).
4. Pot with an everted neck with herringbone incisions on the lip and a band of decoration below the rim (Fig. 2.4). Note: This class consist of small fragments only and although the full extent of the decoration cannot be established, it is considered sufficient evidence for a independant class.
5. Pot with an everted neck with diagonal incisions on the lip and a band of decoration on the neck (Fig. 2.5).
6. Pot with an everted neck with a band of decoration below the rim (Fig. 2.6).
7. Pot with an everted neck with a band of decoration on the neck (Fig. 2.7).
8. Plain pot with everted neck (Fig. 2.8).
9. Plain open bowls (Fig. 3.1).
10. Plain inturned bowls (Fig. 3.2).
11. Plain deep-straight sided bowls (Fig. 3.3).
12. Deep straight-sided bowl with diagonal incisions on the lip (Fig. 3.4).
13. Deep straight-sided bowl with a band of decoration on the inside rim (Fig. 3.5).
14. Inturned bowls with diagonal incisions on the lip (Fig. 3.6).
15. Inturned bowls with a band on the rim (Fig. 3.7).
16. Inturned bowls with a band of decoration on the rim and lower body. (Fig. 3.8)
17. Inturned bowls with diagonal incisions on the lip and a band of decoration on the rim (Fig. 3.9).

Discussion of the ceramics

Although fragmentary, the Kulubele assemblage provided sufficient information to be identified and classified with the Msuluzi phase as first described by Maggs (1980a) for the Msuluzi Confluence site in KwaZulu-Natal.

The most obvious difference is the absence of elaborate decoration on the shoulder and lower body of pots. This attribute seems also to be absent from Ntsitsana in northern Transkei. An interesting aspect of the Kulubele pots is the decoration inside the neck of several vessels. No decoration on the inside of pots has been reported from KwaZulu-Natal or northern Transkei (Prins 1993, Prins & Granger 1993). Inturned bowls from Kulubele were decorated but no typical Msuluzi bowls or carinated bowls were present.

Other ceramic items

Several small ceramic fragments were recovered which may have been parts of figurines (Fig. 4.5). The best preserved fragment was in the shape of a horn and may have been part either of a sculptured ceramic animal or attached to a mask. Several broken fragments of ceramic discs with a single round hole in the centre were also found (Fig. 4.6 & 4.7). The largest disc fragment was 6,5 cm in diameter with fine impressed parallel rows of decoration running from the centre hole (6 mm in diameter) to the outer edge. An interesting find was a flat, semi-circular ceramic modelled object (Fig. 4.3). One end was pressed backwards to create a thick concave surface. Several wide, parallel, U-shaped lines are modelled along the width of the object, suggesting a 'stamp' of some sort.

Iron-working remains

The relatively large quantities of slag and tuyere fragments in the midden excavation indicate that iron-working activities were commonly practiced at Kulubele. The slag consists mainly of small pieces but the occasional fist-size piece was found. Only a few pieces of heavy, dark coloured ore were recovered. No attempts have yet been made to locate the source of ore nor has any analysis been conducted. No complete tuyere cross-sections were found but many end fragments were vitrified.

Iron artefacts from the midden excavation include four iron beads and a small flat point.

Stone artefacts

Apart from the typical lower grindstones and upper grindstones a large number of Later Stone Age stone artefacts were also recovered from the midden excavation. These include scrapers, adzes, cores and flakes manufactured mainly from hornfels.

Bone and ivory

Several bone points, awls (Fig. 4.4), polished bone fragments, a pendant (Fig. 4.2) and a decorated pipe fragment (Fig. 4.1) were found. The pipe fragment has a wide cross-hatched motif at the open end and a second one at the broken end. Two broken ivory bangles were also recovered from the midden excavation.

Shell

A large number of shell beads were recovered, many red ochre stained. No attempt has yet been made to identify materials for bead-making other than ostrich eggshell. OES beads comprise small and large ones, and a few were incomplete. Similar size beads were also manufactured from other shell.

A relatively large number of marine shell fragments and a few complete ones were found at Kulubele, mainly *Perna perna* and *Patella miniata*. The edges of whole *P. miniata* shell and most fragments were ground into a round shape. Their use is not known, but they may have been used for cleaning the inside of pots.

SUBSISTENCE

Mammal remains

The mammal fauna has not been analysed in full but preliminary analysis indicates that the bulk belongs to sheep/goat (J. Brink pers. comm.). Some sheep could be

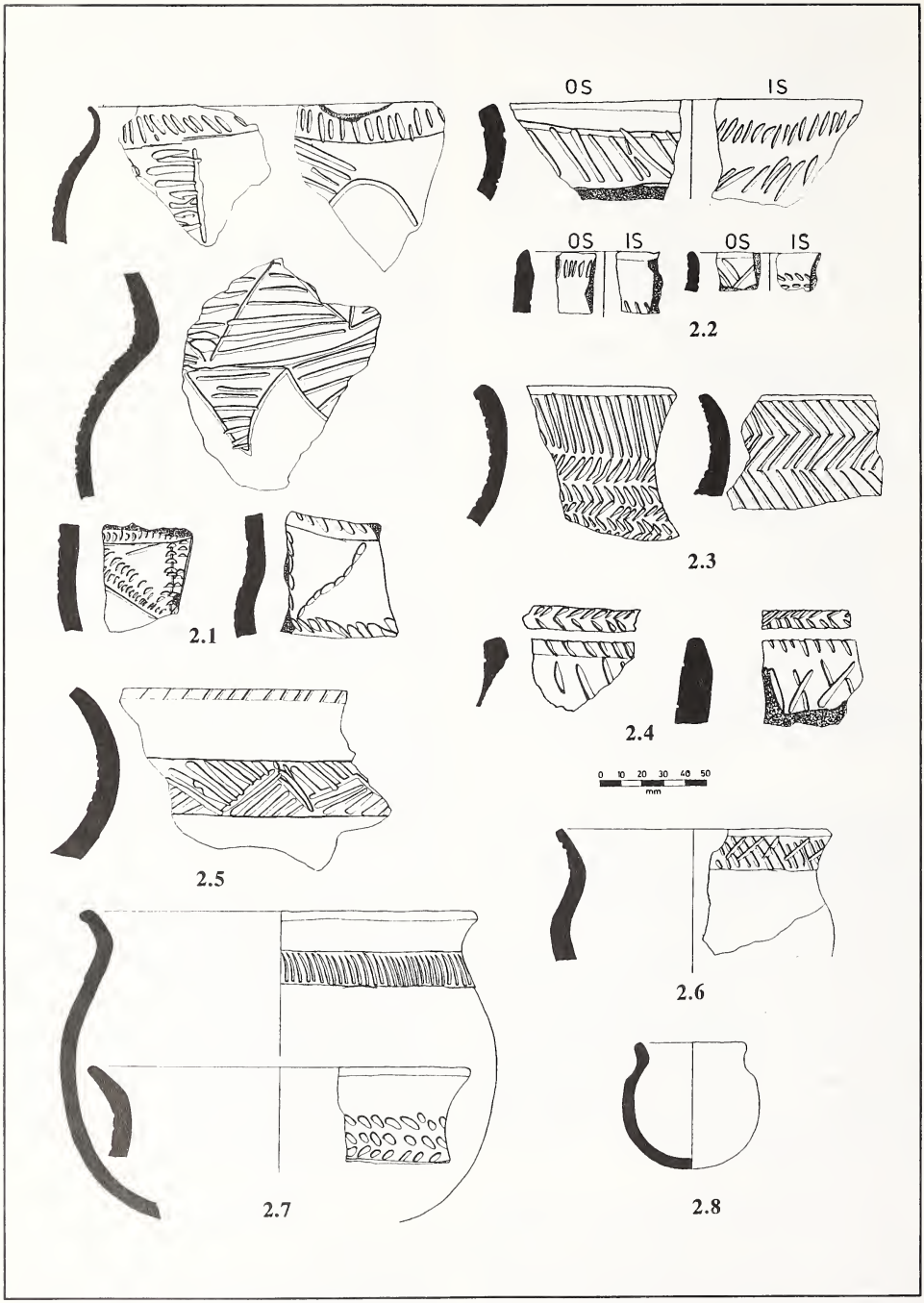

Fig. 2. Decorated pots from Kulubele. Classes 1-8.

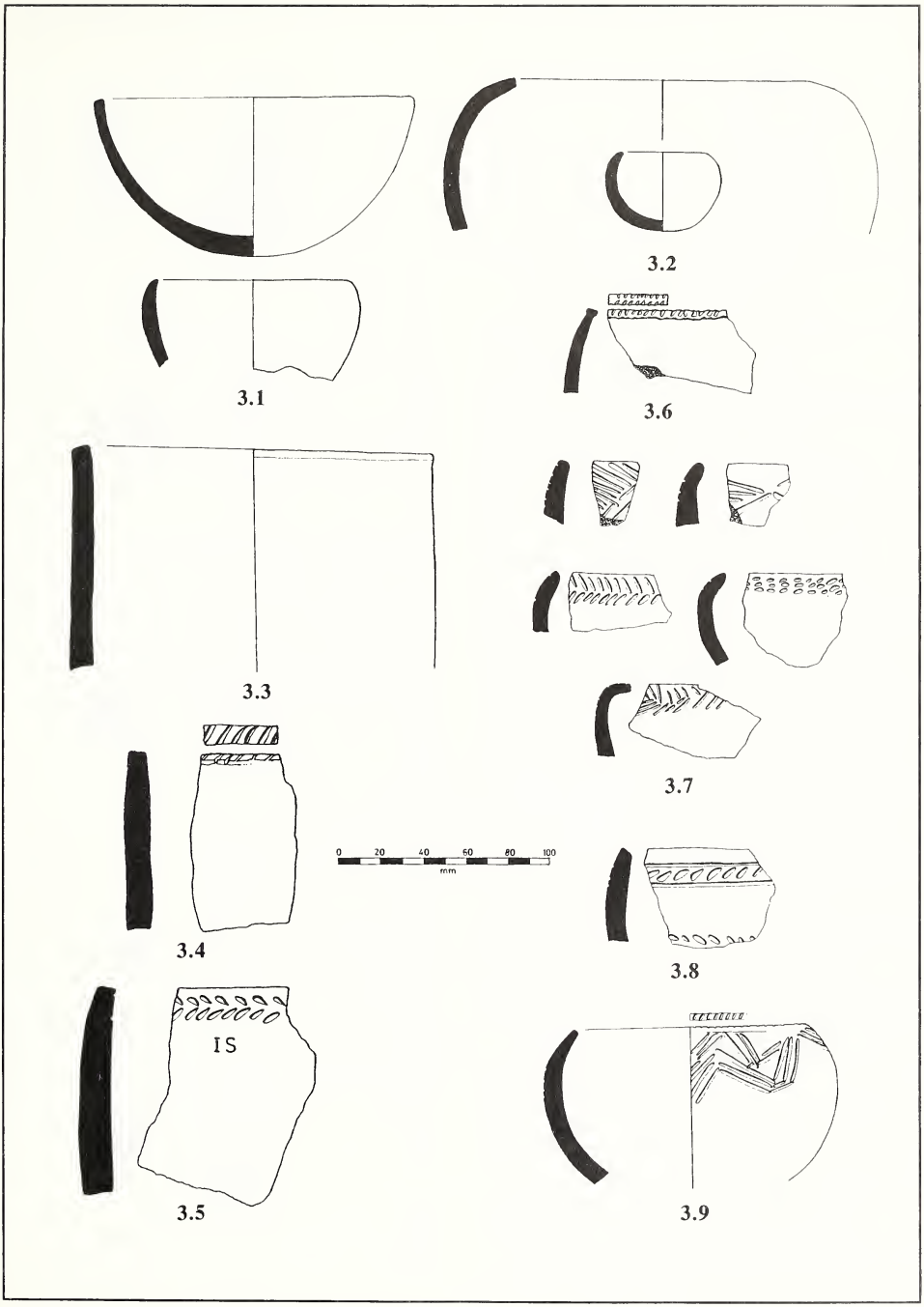

Fig. 3. Decorated bowls from Kulubele. Classes 9-17.

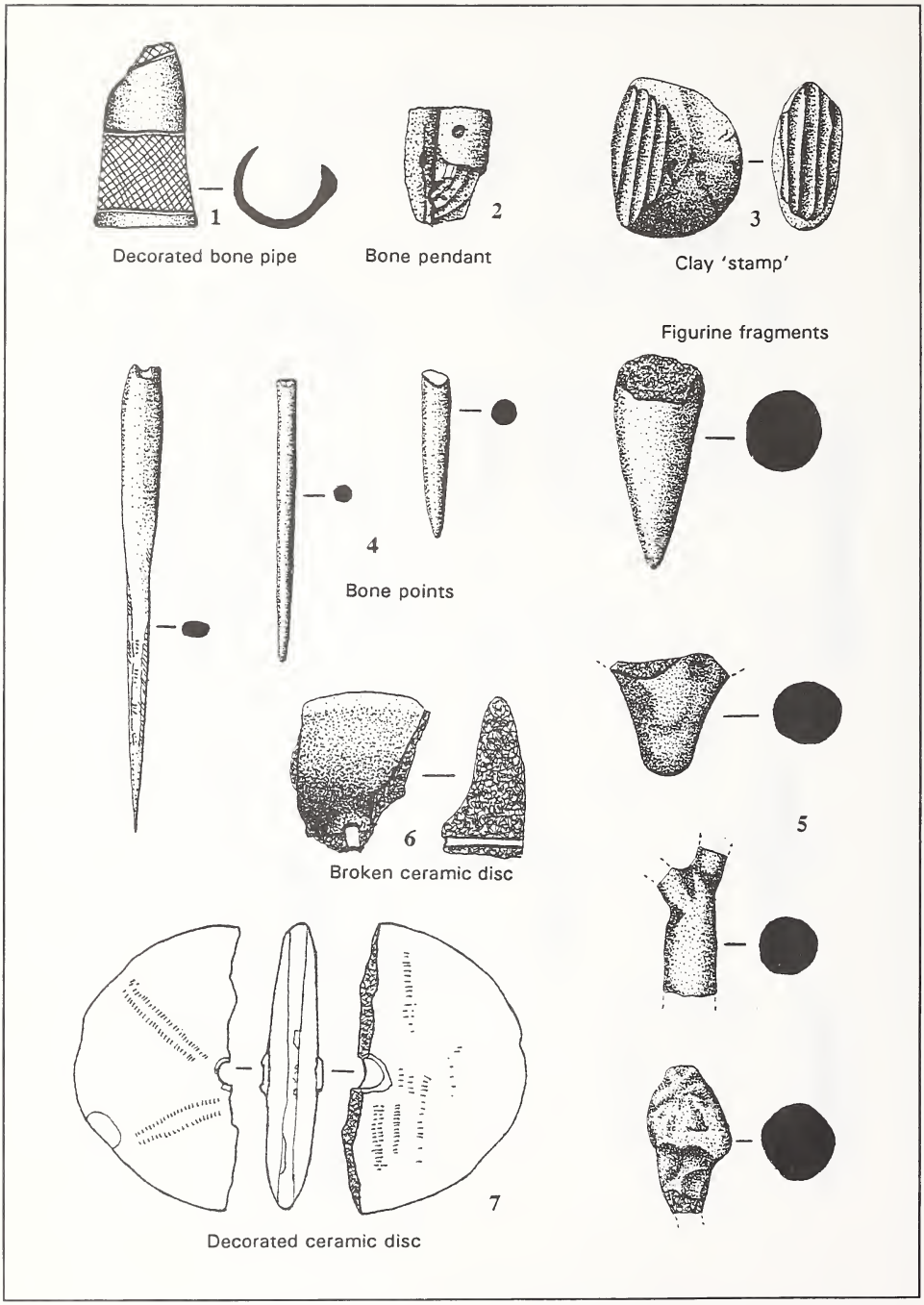

Fig. 4. Cultural objects from Kulubele.

positively identified. Small bovid remains are also present.

CONCLUSIONS

Kulubele is the first Early Iron Age site with *in situ* features excavated south-west of the Great Kei River. It provides us with valuable insights into the first early farming communities in this part of the Eastern Cape Province. As expected, this site was occupied somewhat later than those in KwaZulu-Natal (towards the end/ beginning of the Msuluzi/Ndondondwane phases), but falls within the range of radiocarbon dates for Ntsitsana and Mpame. This suggests a relatively rapid spread of Early Iron Age communities westwards along the east coast of Southern Africa. In general the ceramics from Kulubele are similar to those from the Msuluzi phase in KwaZulu-Natal. The absence of elaborate decorative motives on the shoulder and lower body of vessels suggests that the Kulubele assemblage may represent a transition between the Msuluzi/ Ndondondwane phases. Further research, however, is needed to comfirm this assumption.

Cultural remains suggest that the socio-economic organisation of the Early Iron Age farming communities in the Great Kei River valley was similar to those further north. The dung lens associated with pits in the erosion donga suggests a Central Cattle Pattern (Huffman 1990, 1993). The incomplete OES beads indicates that these were manufactured on site and although it is not known who the bead-makers were, the microlithic stone tools suggest that there was interaction with hunter-gatherers

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PRELIMINARY STONE TOOL RESIDUE ANALYSIS FROM ROSE COTTAGE CAVE*

BONNY WILLIAMSON

Department of Archaeology,
University of the Witwatersrand,
P.O. Wits, Johannesburg, 2050

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ABSTRACT

Microscopic screening of a sample of Rose Cottage Cave lithics revealed a variety of residues including a red blood cell. Colourimetric screening has revealed putative blood films and plant remains have also been identified on a number of tools. These results could significantly affect established stone tool classification systems, which rely on inferred function or shape, and could also affect social interpretations.

INTRODUCTION

Until recently, Stone Age archaeologists examining lithic assemblages had to be content with typological classifications and microwear analysis. Typological classification schemes, though valuable, have inherent problems, not least among these is their subjectivity (Kooyman *et al.* 1992).

Microwear analysis also has problems: (i) there is no way of objectively registering and classifying use-wear, (ii) it is often difficult to distinguish use-damage from chipping due to some other causes, (iii) not all polishes are attributable to identifiable causes, (iv) not all types of rock are suitable for microwear studies (Olausson 1990); (v) two researchers may see and interpret the same wear pattern in different ways, and (vi) many of the visual effects seen by microwear analysts may in fact be the result of the cleaning procedure and magnification used (Moss 1986).

Residue analysis overcomes some of the problems associated with microwear studies. The residues are usually microscopic, which means that highly specialised techniques of microscopy and inorganic and biochemical methods have to be used, but the advantages to the archaeologist are almost limitless. Residues can be used to identify animal carcasses processed at a site, to identify traces of vegetal remains (Kòrbe-Grohne 1988), to infer tool use, and to provide genetic information. Residue analysis comprises the following broad means of inquiry: low and high power microscopy and photography for the identification of residues, colourimetric screening, haemoglobin crystallisation, immunological methods, and DNA extraction and sequencing using PCR and other methods. An investigation of stone tool residues needs to be problem-oriented and question-driven, thus the techniques chosen will depend on the level of information required, depositional conditions and available resources. Microscopy and colourimetric screening are a useful first stage of analysis, and both techniques are inexpensive. Where it is desirable to identify the blood residue to the level of genus then immunological methods, haemoglobin crystallisation or DNA sequencing may be used.

The results of blood residue analysis are often met with some scepticism because many people do not believe that proteins can survive for hundreds or thousands of years. It has been argued that the proteins will denature altogether or at least to the extent that they will no longer be recognisable or reactive. This need not happen, however, because it is in the first few hours of drying that a protein is most likely to be altered. On dehydration the protein becomes hydrophobic (water-repellent) on its outer surface. Bonds also form between the rock surface, the molecule and any soil particles, forming a matrix by which the presence of residues is often recognised.

Notwithstanding the scepticism of some researchers there is substantial evidence for the preservation of haemoglobin and other proteinaceous material found in prehistoric sites (Perron 1991; Brown & Brown 1992). Gurfinkel and Franklin (1988) state that while the protein component of blood may degrade with time, the haem component is relatively stable. Sensabaugh *et al.* (1971), however, feel that limited protein degradation occurs in dried blood samples. Kooyman *et al.* (1992) detected blood residues on tools more than 5 600 years old. They found that standard forensic techniques used to identify stains of unknown origin provide reliable means for identifying the animal species on which the tool was used. Loy and Hardy (1992) found evidence for organic residues on tools dated to 90 000 BP. These organic residues include red blood cells, collagen, resin and hair fragments.

Tool use may be inferred from the residues on them. The assumptions made here are that the residues are ancient and that they are related to tool use. These are reasonable assumptions if it can be shown that none of the excavators sustained an injury while removing the artefacts from the deposit, that the artefects were handled with extreme caution and stored properly and that the deposit was undisturbed before the artefacts were removed. Incidental or modern plant residues have a different appearance to those those arising from deliberate tool use. The same applies to animal residues although incidental blood residues cannot be ruled out as blood may have spilled onto a tool lying on the ground during the butchering of an animal. Animal tissue samples may be interpreted as evidence for the processing of animal products although it cannot be said with certainty at this stage whether this was food processing or artefact manufacture. For these purposes microwear studies and species identification of residues are essential; for instance, inedible plant species found on stone tools would most likely signify artefact manufacture. Apart from residues which appear to be modern, most stone tool residues can be related to ancient tool use.

Cattaneo *et al.* (1990) maintain that the extraction of blood proteins of human and animal origin in ancient material will help to reconstruct ritual, dietary and domestic behaviour. They used forensic methods to analyse skeletal remains from Early Saxon and Medieval burial sites in Britain and their results showed that blood protein survives for more than 1 000 years. Hyland *et al.* (1990) used immunological methods to examine stone tool edges for blood-antigen residue. The results they obtained helped them to answer questions about human diet and palaeoclimatic parameters.

Furthermore stone tool residues can yield genetic and hence evolutionary information in the form of DNA fragments (Bahn 1987; Loy *et al.* 1990; Cattaneo *et al.* 1991; Persson 1991:9). Genetic information, both plant and animal, is invaluable, for example in the study of the development and spread of domesticates. Human genetic data could provide information on population distribution and movements. Lawler *et al.* (1988) isolated nuclear genes from 7 500-year-old archaeological remains which facillitated familial typing of individuals and thus population movement and density studies.

Until now no research into stone tool residues has been done in South Africa where the longest stone tool sequences have been found. There is thus a pressing need for expertise and research in residue analysis in this country. My research begins at Rose Cottage Cave.

RESIDUE ANALYSIS AT ROSE COTTAGE CAVE

The Site

Rose Cottage Cave is situated in the eastern Orange Free State about 3 km east of Ladybrand (28.13S, 27.18E, see Fig. 1). The earliest excavations were undertaken by Malan in the 1940s (Wadley 1991) and have been continued for the last five years by Dr

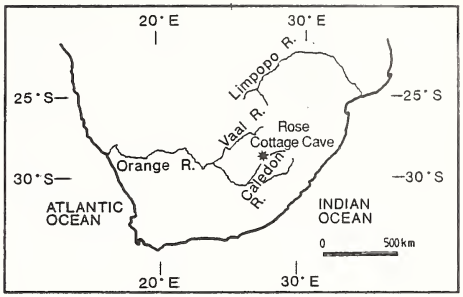

Fig. 1. Geographical location of Rose Cottage Cave.

Wadley. The six metre deep deposit dates from approximately 100 000 BP to 100 BP, and contains a complex series of Middle and Later Stone Age industries. Most Rose Cottage Cave stone tools are made on fine grained opalines or tuffaceous rocks that originated in the Caledon River, which is about 10 km from Rose Cottage Cave.

The lithics for the residue analysis were excavated as outlined in Appendix 1. The 167 artefacts in this study were excavated mainly from square P5 although some samples were also taken from squares Q5, O5 and N5. Table 1 provides a summary of the residues found on the lithics.

I decided to examine every piece of stone, regardless of whether it was a formal tool, an item of waste, a manuport or even a piece of 'puddlestone'. 'Puddlestone' is mudstone formed when pools of mud dry up and solidify (Wadley pers. comm.). The material flakes and crumbles easily and is therefore unsuitable for stone tools. 'Puddlestone' comprised about 12% of the stone sample for this study (data not shown) and a few pieces did carry recognisable residues, mostly of plant orgin.

Most of the lithics were taken from level Pt. This level is dated to 5970 $\pm$ 70 BP (Pta 5934) (Wadley pers. comm.). Samples were also taken from level Ja which is undated but should be about 7000 BP. Level Pt contains a Classic Wilton Industry and Ja contains an Oakhurst Industry (Wadley 1991).

The analysis of the Rose Cottage Cave material has comprised mainly microscopy and colourimetric screening. The results are discussed below.

METHODS OF RESIDUE ANALYSIS

Reference Material

A small reference collection was made. Fresh samples of beef, chicken, pork and human blood were smeared on replicated quartzite flakes. The flakes were also used to macerate some of the muscle tissue of the beef, chicken and pork samples, as well as a grass sample and to scrape a twig taken from a coniferous tree. This was a preliminary comparative collection, a more comprehensive one will need to be made for future studies.

Light Microscopy

An Olympus BHS-2UMA binocular microscope with internal incident light was used to examine the lithics. Polarising filters were used to indentify starch grains and possible cellulose fibres, but the degree of polarisation was not measured. 10x Eyepieces with a measuring graticule in one lense were found to be essential for measuring the sizes of starch grains and other residues. Neo-S-Plan objectives of 5x, 10x and 20x and a long-working-distance of 50x were fitted. The long-working-distance objective gave an effective magnification of 500x and it was found to be indispensable because of the high relief surfaces of the stone tools. The surface to be examined needs to lie as parallel as possible to the focal plane of the microscope. Even with repositioning, a short-working-distance objective did not facilitate the examination of some recesses in the surface of the stone, the position where most residues of any value are likely to be found. The positions on the tools where the residues were seen were marked on a rough sketch of the tool. This facilitated later re-examination where necessary.

Residue types

Table 1 gives a summary of the principle types of residue observed on the Rose Cottage Cave lithics. It can be seen that around 50% of the samples had plant residues on them as well as patches of black film. A red blood cell of mammalian origin (annucleated) was seen on only one tool and ochre also had a very low occurrence.

Table 1. The frequencies of principle residue types from Rose Cottage Cave

Plant residues	Starch	80	49%
	Plant Fibre	75	46%
	Plant Tissue	92	56%
	White, sugary deposit	30	18%
Animal residues	Other fibre	4	2%
	Other tissue	6	4%
	Red blood cells	1	1%
Other residues	Black film	83	51%
	Brown film	18	11%
	Coarse sand	55	34%
	Orange sand	31	19%
	Black & white sand	9	5%
	Black & yellow sand	14	9%
	Ochre	13	8%
Usewear	Utilisation/retouch	24	15%
	Worn edges	32	20%
	Polish	20	12%
	Cortex	4	2%
	Scratches	49	30%
Modern residues	Mycohyphae	57	35%
	Rootlets	59	36%
	Metal scratches	5	3%

ANIMAL RESIDUES

Blood films

Haemoglobin is anisotropic, *i.e.* it disappears under cross polarised light. Blood stains may either have a black, greasy appearance (Richards 1989:82) (Fig. 2) or be glassy and highly reflective (Fig. 3). On thicker films characteristic 'mud-cracking' (Loy 1993) is evident and the colour can range from black to reddish brown to straw-yellow. About 40 of the Rose Cottage Cave tools had putative blood films identifed by colourimetric screening. They occured primarily on opalines, although there were some positive results from tuffaceous rock types and pieces of 'puddlestone'. Most of these residues seem to have been found on flakes but this may be due to the fact that flakes comprised the largest proportion of the lithic collection. Of equal significance is the presence of putative blood films on lithics normally classified as cores and chunks with a very low occurance on retouched lithics.

Loy (1983) reports definite surface blood deposits on 68% of the artefacts he examined from a variety of sites. In my analysis the percentage of artefacts which tested positive with the Hemastix was only 24.2% (or 40 out of 167). The percentage of tools with clear evidence of blood or animal tissue is around 3% (see Table 1). The low values obtained from the analysis of the Rose Cottage Cave lithics suggest that my sampling strategy may have adversely affected this count. Samples were

Fig. 2. A typical black film which gave a positive result with colourimetric testing for haemoglobin.

taken from only three squares and two levels, and not from the entire site. A different area of the site may have yielded a higher frequency of animal residues, so a greater sampling area would have regulated the frequencies. The frequency values are also influenced by the fact that I examined and counted every piece of stone which was excavated instead of selecting those most likely to have residues.

Animal fibres and tissue

Collagen does not have a bright colour reaction under cross polarised light. Hairs are usually straight and cylindrical with scale patterns and a central medulla (Kòrbe-Grohne 1988). The surface can sometimes be

Fig. 3. A glassy film (possibly blood residue).

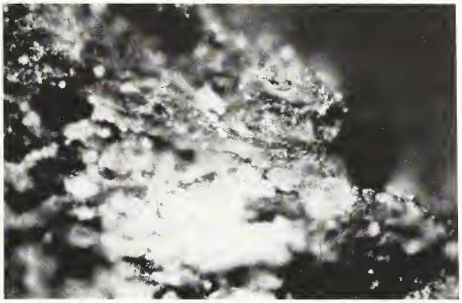

Fig. 4. Putative animal tissue residue on an archaeological sample and which closely resembles that on an experimental tool (see Fig. 5).

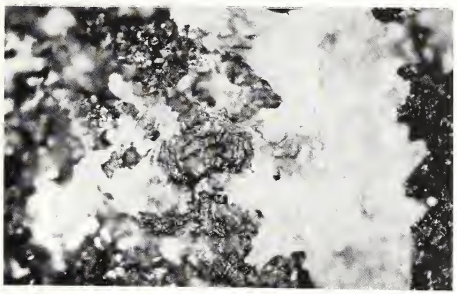

Fig. 5. A reference sample with macerated beef tissue.

quite eroded. The diagnostic cuticle of the hair is needed for species identification using DNA techniques. This cuticle is often not preserved but other morphological features can sometimes be used (Kòrbe-Grohne 1988:76; Shafer & Holloway 1979:30). Several putative animal fibres were found on Rose Cottage Cave tools, noticeably three opaline flakes and an opaline chunk. One large opaline flake had tissue and fibre residues (Fig. 4) resembling the macerated beef tissue on a reference

Fig. 6. A clump of wood fibres.

sample (Fig. 5). The Hemastix test on this flake yielded a positive result which reinforces the interpretation of the residue as being of animal origin. Putative tissue samples were observed on a small opaline scraper, an opaline core, three tuff chunks and the large flake already described.

PLANT RESIDUES

Starch

Starch grains are formed in the plant tissue by the addition of concentric spherical layers of starch. Starch grains are birefringent (*i.e.* they have a bright colour reaction under cross polarised light). A characteristic extinction cross is also visible under cross polarised light. Starch grains are ubiquitous throughout the plant but may be stored in greater concentrations in specialised organs such as tubers and corms (Shafer & Holloway 1979:392). Because of the small sample sizes and unknown numbers of possible sources, more research is necessary before the identification of starch grains to species is viable for archaeological soil samples and tool residues (C. Wallace, pers. comm.). Starch grains were found on a wide range of Rose Cottage Cave tools and in the case of 28% of the lithics these grains were found together with the black films and 3% with residues grouped as animal residues.

Plant fibres

Single fibres of wood are sometimes seen but wood residues occur more often in clumps (Fig. 6). Wood can look a lot like hair but it is more 'rumpled' (Kòrbe-Grohne 1988) and it has a bright colour reaction under cross polarised light due to its cellulosic composition. Of the Rose Cottage Cave lithics, about 45% had plant fibres on them. These are distinct from *mycohyphae* described below and may result from plant food processing or artefact manufacture.

Plant tissue

Plant tissue often resembles bricks (Fig. 7), especially the bark of woody species. The cells are usually irregular, elongated and often layered. Yellow/green deposits (Fig. 8) are often chlorophyll and can be tested

Fig. 7. Macerated plant tissue. The cells can still be seen as elongated and irregular.

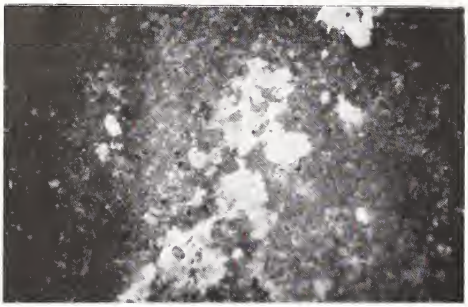

Fig. 8. Possible deposits of chlorophyll.

with test strips and EDTA (discussed below). Unlike collagen (animal origin), cellulose (plant origin) does have a bright colour reaction under bright field cross polarised light. Shafer and Holloway (1988) found that epidermal cells are the most diagnostic of all plant parts. The presence of macerated plant tissue on 56% of the Rose Cottage Cave lithics (Table 1) is even more convincing evidence of plant working than plant fibres.

Other Residues

Stripes and scratches (Fig. 9) which look chalky under bright field incident light often result from the use of metal forceps and trowels during the excavation and handling of the tools. This feature can be confusing to the untrained eye and should be minimised by using sterilised plastic tweezers and careful excavation techniques when removing samples from the deposit. Only 3% of the Rose Cottage Cave samples appeared to have these marks.

Mineral deposits of manganese dioxide (MnO_2) form by precipitation as black shiny films that are are not unlike blood films. MnO_2 is usually associated with plant residues (Loy, pers. comm.) and is soluble in organic solvents but it is not very soluble in water. I tested a black film on a piece of stone from a different site (supplied by K. Kuman) which I knew to be MnO_2 with the test strips. It yielded a positive result so I checked it

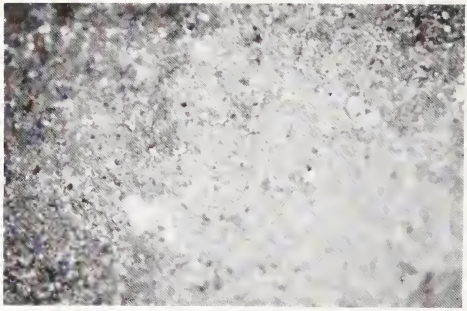

Fig. 9. A chalky-looking scratch on the tool surface caused by the use of metal forceps or trowel during the excavation and handling of the tool.

with EDTA (discussed below) and found that the mineral was chelated which confirmed that the initial reaction was a false positive. The use of the EDTA test for identifying false positives is therefore also justified. Of the Rose Cottage Cave samples, 12 which had black film residues tested negative with the Hemastix. The positive results which were checked with EDTA were found to true positives. This means that even if the black film is not always blood, at least it does not interfere with the Hemastix as a screening procedure.

Colourimetric Screening

Labstix/Hemastix (Fig. 10) are commercially available strips which are usually used for the detection of blood in urine samples. They were found to be a quick and inexpensive means of screening stone tools for possible haemoglobin residues. Hemastix (with a single test pad for haemoglobin) and Labstix (a multiple test strip which includes pH, protein, urobilinogen, nitrite and leukocytes) are both manufactured by Ames, Bayer Diagnostics. The test pads for haemoglobin on each of the strips are identical and are reported to be sensitive to haemoglobin concentrations which fall in the range 150-620 ug/L which is approximately equivalent to five to twenty intact red blood cells per microlitre.

Once an area of interest on the tool surface had been identified by microscopy, 10 ul of ultra-pure water (distilled, deionised and filtered) was applied to the surface of the tool with a variable volume micropipette. A new sterilised disposable nylon tip was used for each sample to avoid cross contamination. The water was then agitated with the tip and allowed to soak for about 60 seconds. The time allowed depended on the porosity and surface nature of the stone. Once the water was withdrawn and placed on the pad of the test strip, the reaction was timed with a stop-watch. (If the residue was found to be relatively insoluble, it was scraped off with a sterile scalpel blade onto a clean microscope slide and then hydrated.) The manufacturers recommend taking the first reading of the strip at one minute. A first conservative reading was taken at 45 seconds, then again

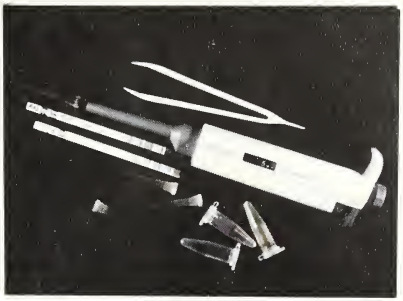

Fig. 10. Equipment used for the colourimetric testing of the residues. Shown here are two of the strips with the haemoglobin test pad at the end of the strip, disposable nylon tips and a micropipette, and some Eppendorf tubes used for hydrating the soil samples.

at 60 seconds and the last reading at 120 seconds. Any reaction after two minutes is considered to be auto-oxidation of the test strip in the presence of atmospheric oxygen. For this reason the bottle must be kept tightly capped and a strip tested with pure water before use each time. If there is a colour reaction before five or six minutes then the bottle is discarded. The test pad was also never blotted directly onto the tool surface as the dye may be transferred onto the surface. The colour reaction is roughly quantitative and is given integer values from 0 to +5. A result of zero indicates a negative reaction (no haemoglobin), whereas +5 indicates an instant dark green reaction and a high concentration of haemoglobin. Trace amounts of haemoglobin are recorded as 't' and appear as isolated green spots on the test pad.

The results of colourimetric screening using Hemastix and Labstix test-strips are as follows: 57 of the 167 tools were tested using the Hemastix. Of these, 17 (30%) gave a negative result, 15 (26%) gave a trace amount, 8 (14%) gave +1, 3 (5%) gave +2, 5 (9%) gave +3, 3 (5%) gave +4 and 6 (11%) gave +5 results. Those tools that gave +5 result were put aside for further molecular analysis, probably DNA sequencing, at a later date. Tools which gave lower readings than +5 may be analysed if time allows.

Soils were tested for haemoglobin by placing a small amount of the soil in an Eppendorf tube (see Fig. 10) and hydrating it with approximately 100 ul ultrapure water. The results were all negative except for one sample which was checked using EDTA as described above. The EDTA test result was negative indicating that the initial positive result was false and was due to chlorophyl or mineral contamination. The negative results from testing the soils also indicate that the organic remains which caused the colour reaction on the Hemastix did not originate in the surrounding soils.

The use of Hemastix for the detection of blood residues has been criticised by numerous authors (Custer *et al.* 1988; Gurfinkel & Franklin 1988; Downs &

Fig. 11. Modern contamination in the form of rootlets which grow over and adhere to the surface of the tool. Microscopic root hairs can be seen.

Lowenstein 1995). The criticisms focus on the the non-specificity of the technique in that the psuedoperoxidase reactions can also be induced by certain vegetable and bacterial peroxidases and by chlorophyll (Loy & Hardy 1992). Microscopic screening of the tools to ensure that no algal growth is visible, and the EDTA test described above, can minimise the false positives induced by these agents. However, it was deemed reasonable to use the Hemastix test for the Rose Cottage Cave lithics as the test was only a preliminary means for identifying tools/residues which would be suitable for further analysis. Thus any false positive reactions with the Hemastix would be identified and not lead to further spurious results.

CONTAMINATION

Microscopically Visible Contamination

Rootlets

Modern contamination can be seen in the form of rootlets which grow over and adhere to the surface of the lithics (Fig. 11). Rootlets are clearly different from plant residues which result from the processing of vegetal material as the latter is often macerated. The fine root hairs of the rootlets are usually visible and the rootlets appear to lie on top of any matrix. Rootlets occured on 36% of the Rose Cottage Cave lithics and were not interpreted as evidence for plant working.

Mycohyphae

Other contaminants that are relatively easy to identify are *mycohyphae*, the roots of fungal species. *Mycohyphae* are characterised by right angle joints but their colour may vary (Fig. 12). Ross (1979:9) describes the hyphae as the "apical extension of branching filaments" which are usually single celled (also Webster 1970:60). Webster (1970) states that *hyphae* may differ considerably in morphology. Almost 35% of the Rose Cottage Cave sample examined had evidence of *mycohyphae* which I have classified as 'modern residues' (Table 1) along with rootlets and metal scratches.

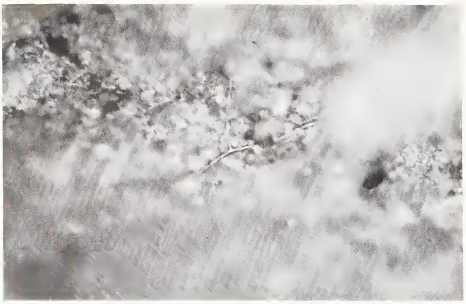

Fig. 12. Another form of modern contamination are the roots of fungal species, or *mycohyphae*. Note the right angle joints in the root system. The colour may vary but still gives a characteristic bright colour reaction under cross polarised light.

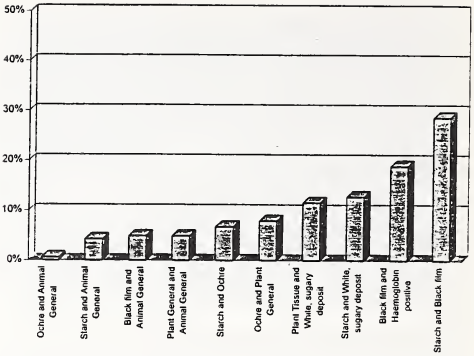

Fig.13. Selected combinations of the residue types found on the Rose Cottage Cave lithics.

DISCUSSION

Residues have been identified on all material types and most tool types of Rose Cottage Cave lithics, except those classified as chips. The analysis shows a low proportion of animal residues, while at least 50% of the Rose Cottage Cave lithics examined here displayed plant residues. The processing of plant food may have been emphasised in Rose Cottage Cave or plant residues may be better preserved. The high frequency of plant residues in the sampled area may be a function of the spatial use of the cave. The manufacture of artefacts such as arrow shafts, bows, digging sticks, baskets and so on, would also be expected to leave plant residues on the stone tools that were used in their manufacture.

This project has shown that flakes and chunks were used as tools because many of them carried residues. There is sufficient evidence to suggest that flakes, cores and chunks were used to process plant and animal materials. Microwear, replication studies and residue analysis should be used in a complementary manner to provide archaeologists with a better understanding of stone tool use and curation. Shafer and Holloway's (1979) study of the lithics from Hind's Cave in south-west Texas, led them to conclude that much of the tool use there was expedient; any sharp flake would do. Retouched or sharpened tools probably reflect long term, complex histories of tool use. This initial study of the Rose Cottage Cave material supports a similar interpretation for the lithics at the site, as well as the possible interpretation that formal tools served some function other than, or in addition to, the processing of food or the manufacture of artefacts. Formal tools may have served a social function, to denote alliances or as exchange items.

Residue studies can enhance information already gleaned from the archaeological record. The combinations of residue types from the Rose Cottage Cave material imply multiple use of tools. Scrapers, for example, may not have been used only for hide working because both plant and animal residues on a single scraper suggest that it was used for processing both vegetables and meat. Such results stress the need for archaeologists to review their assumptions of stone tool functions. Some residue types are related. For example, the anomalous black film, which was found on 50% of the tools, but which tested positive for haemoglobin in only 22% of the cases, has a higher correlation with starch grains (28%) than with other animal residues (3%), such as animal tissues, fibres or red blood cells. This suggests that some of the black residues are perhaps of plant origin. The total absence of a coincidence of ochre and general animal residues suggests that none of the lithics in the analysed sample were used for the joint processing of these materials. This is of interest because ethnographic evidence shows that ochre was sometimes used in the processing of hides (Watts, pers. comm.) and animal fluids are thought to have been mixed with the pigments used in rock art (How 1962:33; Jolly 1986; Lewis-Williams 1986).

Ultimately, stone tool residue analysis may help to change interpretations of the social behaviour of prehistoric societies. Plant working has traditionally been seen as 'women's work' while hunting, butchering and the manufacture of stone tools have been seen as the work of men. The presence of plant and meat residues together on tools implies that behaviour was more flexible than has previously been recognised. Both genders may have performed all tasks, including manufacture of stone tools. Furthermore, the use of a particular tool may not have been exclusive to one gender. The suggestion that there was no gender restriction on the use of stone tools empowers Stone Age women and supports Gero's (1991) contention that women both made and used stone tools. The preliminary results from Rose Cottage Cave clearly show that further residue analysis will be profitable.

FUTURE RESEARCH

The main emphasis of future research will be in the

direction of DNA extraction, amplification and identification. I hope to extract comparative DNA samples from the faunal remains from Rose Cottage Cave, listed by Plug and Engela (1992) for the Late Pleistocene and Holocene periods. Protein residues will be analysed to see how well they correlate with the species mentioned in the list.

A secondary aim will be to build a comparative collection of blood and protein samples. This will involve setting up a data base of blood samples from a wide range of African fauna. I aim to do this in collaboration with the Veterinary Department at Pretoria University and the Johannesburg Zoo. This research will also be of great value to other academic and archaeological institutions in South Africa.

ACKNOWLEDGEMENTS

I would like to thank Dr Lyn Wadley for reading drafts of this paper and for her support, encouragement and help during the project. The Rose Cottage Cave project is funded by the University of the Witwatersrand and the HSRC. I would also like to express my grateful appreciation to Dr Tom Loy for his help and support and for access to his unpublished material. Thanks also to Bruce Hardy for the protocol on excavating and handling of stone tools.

APPENDIX

A feasible sampling strategy for the retrieval of lithics destined for residue analysis needs to be decided upon before sampling begins. A sampling technique should include a spatial spread and as many rock types as possible. Particular attention should be paid to activity areas such as hearths and pits.

Archaeologists need to be made aware of the general problems associated with residue analysis and the precautionary measures that need to be taken. A protocol for the excavation and handling of stone tools for residue analysis is outlined by Hardy *et al.* 1995 (in press). Excessive handling could cause the residue matrix to rub off. It is also important that soil samples are taken (about one tablespoon) from nearby, but not adjacent to, the tool. The background levels of soil organics may be determined from these soil samples and thus used as controls to test for false positive results (Custer *et al.* 1988). Ideally, disposable powder-free surgical gloves should be worn by excavators. Tools may be gently lifted on the tip of a trowel and dropped into clean individual zip-lock plastic bags. (I have found new bank bags useful). Tweezers, preferably plastic (such as contact lens tweezers available from most opticians) can also be used. They should be sterilised in commercially available bleach (jik) and dried thoroughly with a tissue between samples. Excess soil should not be brushed from tools as residue can be lost. Brushes used in excavation should have synthetic bristles.

Common sense and forethought as to the possible sources of contamination will go a long way to ensuring that residues do not become contaminated with modern DNA. It is also strongly advised that the analyst or lab for which the samples are destined be consulted prior to excavation.

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SALVAGE EXCAVATIONS AT PLANKNEK, POTGIETERSRUS, NORTHERN PROVINCE*

T.N. HUFFMAN & R.H. STEEL

Archaeological Resources Management, Archaeology Department, University of the Witwatersrand, Wits 2050

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ABSTRACT

Two sites at Planknek were excavated before construction began on the N1 Toll Road. Six trenches were excavated in site 2429AA59 on the north side of the saddle, yielding a considerable amount of metal production debris, refuse bones and broken pottery. The pottery belongs to the Moloko and Letaba Traditions and shows that Northern Transvaal Ndebele lived there from about AD 1780 to 1840. Three trenches were excavated in site 2429AA61 on the south side of the neck. Ndebele lived here from about AD 1855 to 1875. Earlier material was found below the neck on the north side but was not excavated. These mitigation measures clarified the culture history sequence at Planknek and recovered sufficient material for future research.

INTRODUCTION

The South African Roads Board (SARB) contracted the Northern Toll Road Construction Company Limited (NTRC) in 1994 to construct a toll road from Middelfontein (just north of the Kranskop Toll Plaza) to Pietersburg.

In 1990, at an earlier stage of planning, Mark Wood Environmental Consultants, on behalf of Scott and De Waal, commissioned the Archaeology Department at the University of the Witwatersrand to survey for archaeological sites along three alternative routes. During this survey, the archaeologists identified an important Iron Age complex on Planknek (24.11.03S; 29.04.16E), just east of Potgietersrus (Fig. 1).

Planknek is a saddle in a quartzite ridge that trends NW/SE (Fig. 2). On the northwest side the height of the ridgetop varies between 1350 and 1450 metres. On the other side it varies from 1630 to 1730 metres and then curves around to become part of the Maribashoekberg. The saddle itself is about 1290 metres high, some 50 metres above the plain. The Dorps River on the north side flows down to the Nyl, creating a zone of good agricultural soil. The south side is drier and more sandy.

Different sides of the neck yielded Iron Age sites of different time periods and types, some with stone walling. Other studies in the area (Moore 1981; Loubser 1994) suggest that the Northern Transvaal Ndebele had probably lived in the stone-walled sites.

In February 1995, the new environmental consultants on the NTRC team, Cave, Klapwijk and Associates (CKA), commissioned Archaeological Resources Management (ARM) to investigate Planknek. ARM's mitigation policy is to recover data useful for future research. To achieve this goal, it is necessary to establish the cultural history sequence of the area. By agreement with NTRC, road construction in the neck would not begin until March 6. Accordingly, ARM staff spent six days excavating the complex. We began in the saddle.

EXCAVATIONS

Saddle (2429AA59)

Broken grindstones, ash mounds and slag heaps lie scattered over the saddle in and around vestiges of low stone walling. Because of the density of vegetation, the plan of the walling is not obvious. We therefore first excavated features in an open strip beneath a powerline, designated as Area A (Fig. 3).

Area A

Trench I was a 1 x 5 m cutting in an ash heap. For vertical control, it was excavated in 20 cm levels. A loose gravelly orange crust lay on top of an ashy midden, containing much pottery and broken bone. This midden in turn rested on a hard gravelly surface surrounding two storage pits, both filled with a continuation of the midden deposit (Figs 4 & 5).

Trench I

level 1	orange gravel crust with ash and artefacts	0-20 cm
level 2	ashy midden	20-35
	hard gravelly surface	35
level 3-7	fill of Pit B	35-160
	shaley sub-stratum	160

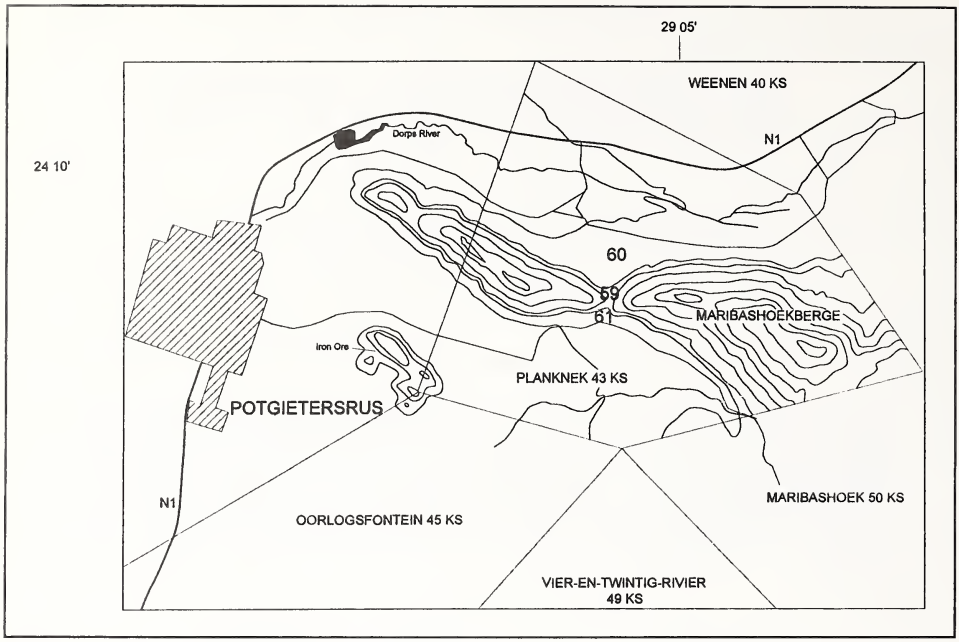

Fig. 1. Location of Planknek on Map 2429AA.

Only a portion of Pit A could be excavated because of its position within the trench, but it was at least 1,25 m wide at the top and 59 cm deep below the hard surface. More of Pit B could be exposed: it was slightly bell-shaped, measuring 1,60 m at the top and 1,25 m deep. It had been dug into a shaley sub-stratum.

The micro stratigraphy in Pit B represented short-term dumping episodes. Ashy midden deposit went down about 75 cm to a zone of stones mixed with khaki-coloured cattle dung. Five centimetres of charcoal lined the bottom of the pit.

Trench II, 1 x 4 m, also produced midden material. At the east end ashy deposit lay on top of a yellow-orange crust about 5 cm thick. This crust dipped west where the overlying midden reached 50 cm in depth. At the east end, the crust lay on top of more midden. Another yellow-orange crust covered a few centimetres of midden that rested on a hard gravelly surface (Figs 6 & 7). A cluster of stones on this floor at the west end included a broken upper grindstone.

Trench II

level 1	ashy midden	0 - 10cm
level 2a	yellow-orange crust	10 - 15
level 2b	ashy midden	15 - 45
level 3a	yellow-orange crust	45 - 50
level 3b	ashy midden	50 - 55
level 4	hard gravelly surface	55

Fig. 2. Planknek from the north.

The middens in both trenches yielded a large number of bones. For the purposes of this project the analysis involved separating the samples into identifiable cranial pieces (C), such as jaws, mandibles and teeth, identifiable post cranial pieces (PC), such as joints and phalanges, and unidentifiable post cranial pieces (UNID), such as fragments of bone shafts and ribs. In addition to these pieces, some bone fragments had been modified (M) by use, such as scraping, or by manufacture.

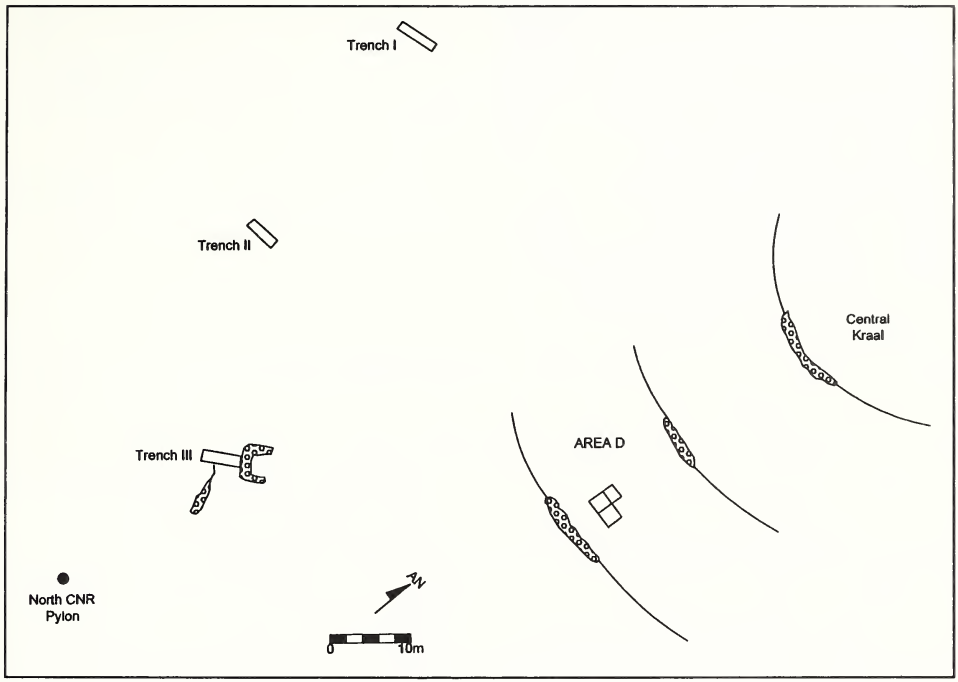

Fig. 3. Area A and D in Site 2429AA59.

Trench I

Level	C	PC	UNID	M
1	7	61	354	7
2	7	80	118	4
Pit A 3	1	2	7	
Pit B 3	1	16	94	10
4	1	17	160	4
5	2	47	182	
6			53	
7	1	3	28	

Trench II

Level	C	PC	UNID	M
1	2	6	48	
2b	1	10	78	1
3a crust		4	57	3
3b	6	44	376	4
4 gravel	1	13	71	2

Besides the bones a few other artefacts occurred in the middens, including upper grindstones (**UGS**), ostrich egg shell and other shell beads (**OES**), tuyere fragments (**T**), metal slag (**SLG**), fragments of metal (**MF**) and specularite ore (**OR**):

Trench I

Level	T	SLG	MF
1		24	
2	4	5	1
2			
Pit A 3			
Pit B 3	1		
4	3		
5	4		
6			
7			

Trench II

Level	UGS	OES	SLG	MF	OR
1			1		
2b	2		2		2
3a crust					
3b		3		1	
4 gravel		1			

Fortunately for culture history purposes, both middens also yielded identifiable pottery. We sorted this pottery in the field, discarding undecorated body sherds and retaining rims, decoration and unusual profiles:

Fig. 4. Trench I in 59A showing gravelly surface and pits A & B.

Trench I

		rims	decor.	sherds
Level	1	12	5	179
	2	10	3	78
	3			4
PitA	3			
PitB	3	2		138
	4	8	1	118
	5	3		100
	6	1		46
	7			4

Trench II

		rims	decor.	sherds
Level	1	2		25
	2b	6		51
	3a crust			28
	3b	15	3	157
	4 gravel	6	2	64

Two styles of pottery were present. The first was Moloko, characterised by a series of parallel lines separating black graphite burnishing in the upper portion of the vessel from red ochre burnishing below (Fig. 8). This style of pottery was made by Sotho-Tswana speaking people (Evers 1983). The second style was Letaba, characterised by a wide band of cross-hatching, hatching or alternating triangles on the upper shoulder of jars and below the rim of bowls (Fig. 8). This style was made by Venda and people influenced by them in the eastern lowveld (Evers 1979). Both styles occurred together in Trench II:

Trench I			Trench II		
Level	Moloko	Letaba	Level	Moloko	Letaba
1		3	1		
2		2	2b		
PitA 3			3a gravel		
PitB 3			3b	1	1
4		1	4 gravel	1	1

Trench III was a 1 x 5m cutting connecting two stone circles (Fig. 9). The larger circle, curving west, had been partially destroyed during construction of the power line; it may also have been robbed during antiquity. Our trench went through a section of this missing wall. The smaller, subrectangular circle, curving east, was still intact.

Section B, inside the large circle, contained three zones of cattle dung: white granules that continued across the missing wall area; light grey dung; and light brown dung on top of a red compacted dung surface.

Trench III

	A		B	
Level 1	light grey dung	0-15 cm	white granular dung	0-10 cm
Level 2	brown soil	15-20	light grey dung	10-27
			light brown dung	27-33
			red dung surface	33-34
Level 3	sterile rubble	20	sterile rubble	34

Both the light brown dung and dung surface ended against small stones that marked the missing wall.

Three upright burnt posts in section B were next to this junction, a forth was on its side at the edge of the trench in the middle of the missing wall, a fifth lay on the outer wall in section A and two more stood upright nearby. Presumably, these posts filled the gap in the missing wall.

In section A, light grey dung had washed out of the kraal, filling the area between the two walls to a depth of 15 cm. Near the large wall the dung lay on top of sterile rubble, but brown soil occurred under the dung next to the small wall. Presumably the smaller circle is more recent. Trench III yielded some Letaba pottery and a few other artefacts:

Trench III

A

	Pottery rims	decor.	sherds	SLG UNID	Bone
Level 1					
2	2	5	13	1	6
3	1				

B

	Pottery sherds	SLG UNID	Bone
Level 1	2		
2	7	3	1
3			

Area D

For clarity on the overall residential pattern, we examined a large stone circle in the centre of the neck. We used a soil auger to search for burnt houses, but without success. Finally a 2 x 4 m trench was excavated inside the outer ring of the circle in an area with

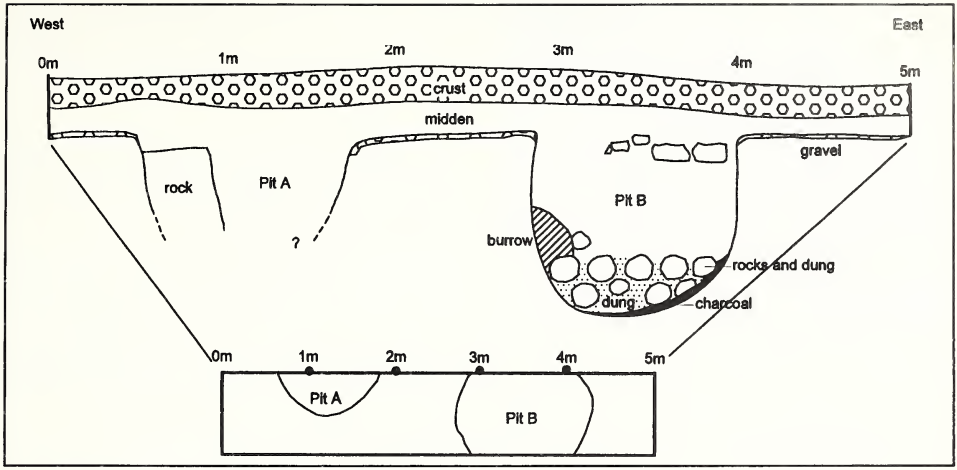

Fig. 5. Plan and north section of Trench I in 59A.

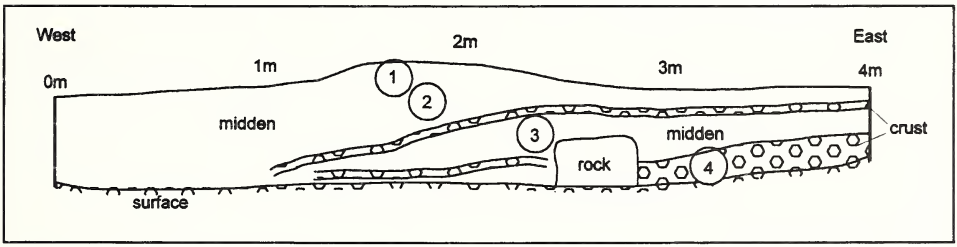

Fig. 6. North section of Trench II in 59A.

numerous upper and lower grindstones. A further 1.5 x 2 m section was later excavated (Fig. 3).

Area D

Section B	
dark brown soil	0-10cm
red floor	12-15
dark brown soil	15-20
red floor with 3 plaster surfaces	20-22
grey midden	22-37
sterile red soil and pebbles	37

Five to 10 cm of dark brown humus covered an uneven red occupation horizon. This horizon varied from 2 to 5 cm thick and included upper and lower maize grindstones. There was no evidence that this surface had been fired.

Another occupation horizon lay some 5 cm underneath. It too consisted of an unfired red floor. In this case there were at least three plaster surfaces from 2 to 5 mm thick (Fig. 10). The lower surface was relatively flat and even. One patch in section B was much harder than anywhere else, and it may have been an outside fireplace. An upper maize grindstone lay on the floor near this hard patch, and carbonised sorghum was found on the western edge. The lack of firing and large floor area indicate that this was a courtyard in a residential zone.

Grey midden lay underneath the courtyard in sections B and C. This deposit rested on rocks and red soil. It represents an earlier use, but the scope of the excavations was too limited to clarify the relationship between the midden and stone walls.

This excavation yielded fewer artifacts than the middens:

59D

	Pottery rims	decor.	sherds	T	MF	Bone PC	UNID	Other
Level 1		1	36	2			5	
2	2		25	1	1	4	10	sorghum
midden	2		27	1		1	7	

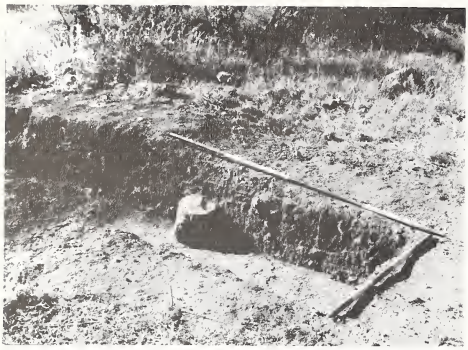

Fig. 7. Trench II in 59A. Note thick yellow-orange crust on top of gravelly surface in right corner.

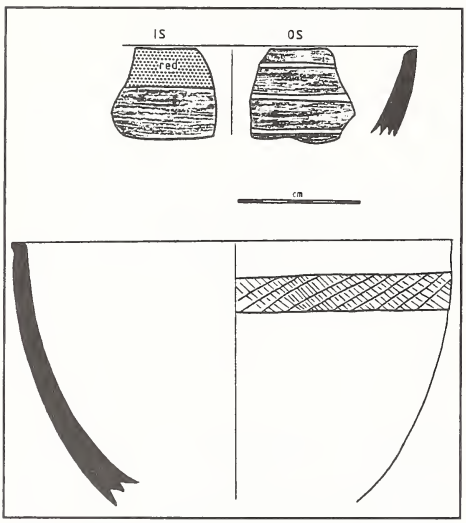

Fig. 8. Moloko (top) and Letaba pottery from 59A.

Although the walls were covered in dense vegetation, it was possible to see that they formed a variation of the Central Cattle Pattern. In this pattern a residential zone with houses, kitchens and privately owned grain bins surrounds cattle kraals. In the case of 59D, the plastered courtyard lay between the outer wall and cattle kraals (Fig. 3). The cattle area appeared to consist of a semi-circle of smaller kraals around a larger area in the centre. The distribution of *Euphorbia* suggest that a funnel-shaped entrance provided access to the centre.

The funnel entrance, semi-circle of kraals and smooth outer wall place this site within Loubser's (1994) Group II pattern. This particular pattern of walling was associated with the Northern Transvaal Ndebele in the Pietersburg area between about AD 1700 and 1900. The defensive location of site 59 also dates it to the troubled times from AD 1780-1840. Indeed, the local name for the site (according to Frans Ramasubani, the oldest black resident) refers to a period of fighting - 'Sofale sa Mmatsetsenwa Ritshimbila Vhuraliya'.

Areas B and C

Two 1 x 1 m squares were placed on slag heaps exposed in a road cutting on the north eastern side of the neck about 250 m away from Areas A and D. We excavated these two squares in order to recover a sample of metal production residue.

In 59B, the square lower down the slope, about 4cm of grey-brown topsoil covered a 5 cm lens of broken tuyeres, slag and specularite ore. In 59C about 8 cm of topsoil covered a 10 cm lens of tuyeres and slag. Both lenses of residue lay on top of quartzite colluvium. No diagnostic pottery was recovered, but both areas probably date to the Late Iron Age.

59B		59C
0-4 cm	grey brown topsoil	0-8 cm
4-9	slag, tuyeres	8-18
9	sterile colluvium	18

The excavation in 59C uncovered the most material:

	Tuyere	Slag	Sherds	Furnace Fragments
59B	17	19	2	
59C	96	88	8	2

South Side (2429AA61)

Metal working was noted on the south side of the neck (Fig. 11). One dark slag heap lay exposed in the middle of the neck near the bottom at about the 1250 m contour. We placed Trench I on top of the slag heap and divided it into three sections: A was 2 x 2 m, B was 1 x 2 m and C was 1 x 4 m long (Fig. 12).

Generally, a dark zone of iron slag, ore and broken tuyeres (Layer 1) lay on top of red brown soil with little slag (layer 2) that graded into stones and red brown soil without any artefacts. In section C the slag zone varied from 5 to 17 cm. Ant disturbance in section A carried slag and tuyeres down to 35 cm (Fig. 13). After sieving, one bucket yielded 5.11 kg of residue. We saved the bucket sample as well as a range of vitrified tuyeres, possible furnace fragments, hammerstones and ore. As with site 59B, the ore was a form of specularite.

Trench I

	A		C
Level 1	0-15 cm	dark zone	0-17cm
Level 2	15-23	dark zone merging into red brown with few artefacts	
Level 3	23	sterile red brown	17

About 50 m east, other slag and midden debris were exposed underneath the remains of rectangular house foundations (Fig. 12). We sited Trench II (1 x 5 m) in a

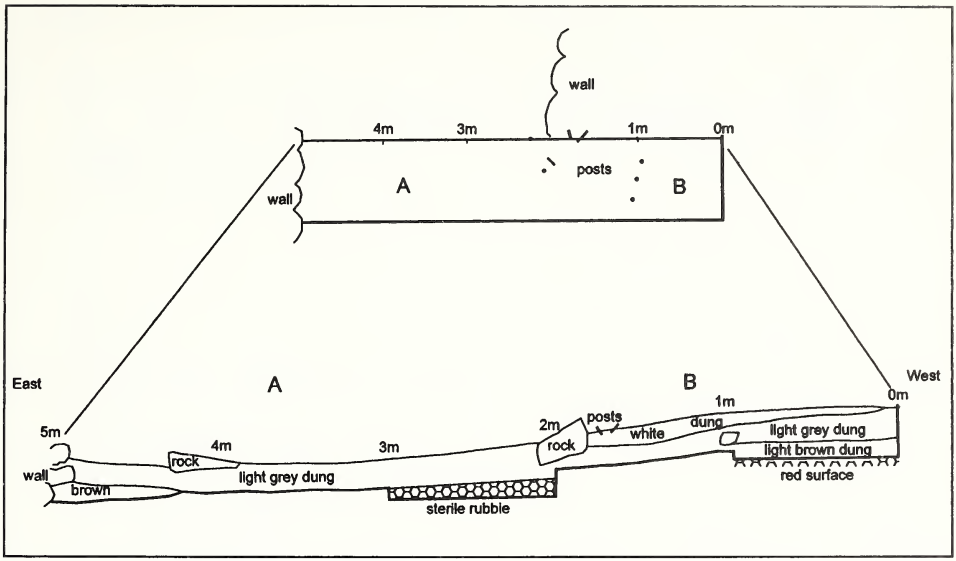

Fig. 9. Plan and south section of Trench III in 59A.

fresh bulldozer cutting to the side of the house remains and excavated in 10 cm levels. The grey soil of Level 1 yielded glass and other modern objects, while Level 2 contained a few pieces of slag, undecorated pottery and a blue hexagonal glass bead. Level 3 was sterile red subsoil (Fig. 14).

In the north end of the trench the grey soil filled a pit about 25 cm deep (Fig. 15). The top of the pit was marked by several stones, including a lower maize grindstone and two upper grindstones, one large and one small. The pit-fill contained a few pieces of slag and much charcoal.

Trench II

Level 1	0-10 cm	grey with modern artefacts
Level 2	10-20	grey with pottery, slag and glass bead
Level 3	20	sterile red

A third trench nearby yielded more. Trench III (1 x 4m) was placed between a modern soil pit and low modern stone wall. The grey soil of the village horizon was excavated in 10 cm levels. Next to the stone wall 15 to 17 cm of grey deposit lay on the red subsoil (Fig. 16).

Trench III

Level 1	0-10 cm	grey with artefacts
Level 2	10-17	grey with artefacts
Level 3	17	sterile red

All artefacts came from the grey zone.

Trench III

	slag	pottery	bone
Level 1	38	32	
Level 2	72	35	3

Another blue hexagonal glass bead was found further upslope along the path. In this higher area were low stone circles and stone-walled cattle tracks. One cattle track led to a complex of walling at about the 1300 m contour on the southeast side of the neck. Part of this complex had been destroyed for the power line and new road. What remains appears to belong to Loubser's (1994) Group III pattern. This type of walling and the blue hexagonal beads date the southern settlement from about AD 1855 to 1875. Earlier material occurred on the north side.

North Side (2429AA60)

The bottom of the neck on the north side was covered in *Dichrostachys* sp., a thorny shrub that grows on disturbed soil. Various eroded patches under the *Dichrostachys* sp. contain slag, bone, pottery and grindstones. Some grindstones bear long oval grooves characteristic of sorghum and millet milling before the introduction of maize. Decorated pottery shows that two early periods are represented. The oldest pottery belongs to the Eiland phase (Fig. 17) of the Early Iron Age, dating to between AD 900 and 1300. The second belongs to the black/red incised phase of the Late Iron Age Moloko Tradition, dating to between AD 1350 and 1600. There were probably several scattered homesteads making up a community during each period. During the

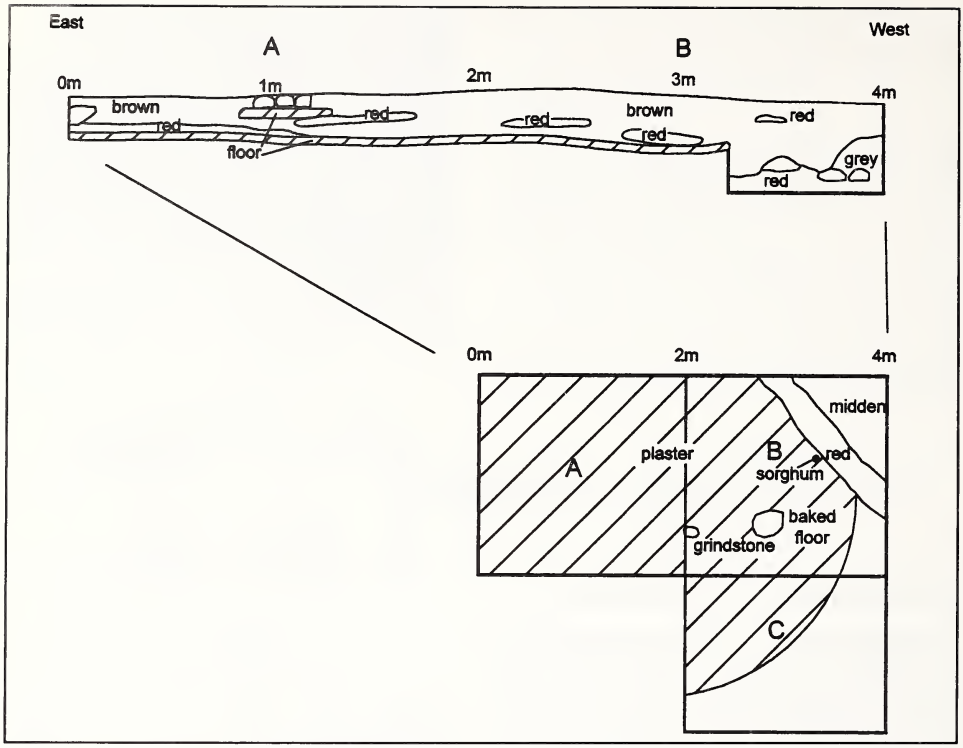

Fig. 10. Plan and south section of Area D.

Fig. 11. Planknek from the south.

survey, the early Moloko material was particularly obvious under the power line west of the new road alignment, while Eiland material was exposed in the new road area to the east. More slag and pottery of both periods occurred in the fields between the neck and the river. No evidence of these periods was found on the south side.

DISCUSSION

The purpose of the mitigation was first to understand the sequence of occupations at Planknek and secondly, to recover sufficient material for future research. We achieved both aims.

Eiland ceramics constitute the last phase of the Early Iron Age Kalundu Tradition, and it was replaced by the first phase of Moloko, representing the spread of Sotho-Tswana speaking people (Huffman 1982; Evers 1983). Eiland and early Moloko villagers chose the north side of the neck because of the close proximity of the Dorps River and good agricultural soil. We did not excavate these deposits because the ceramic sequence is relatively well known and because few sites will be damaged by the new road. We concentrated instead on metal production and the settlement complex in the neck.

The excavations in the neck and on the south side yielded a representative sample of metal production debris. The small slag from Trenches II and III in Site 61 was probably derived from smithing activities. On the other hand extensively vitrified tuyeres in Trench I suggest that this heap was generated by smelting activity. The specularite ore from 61 and 59B & C was not commonly smelted in Iron Age communities. Signifi-

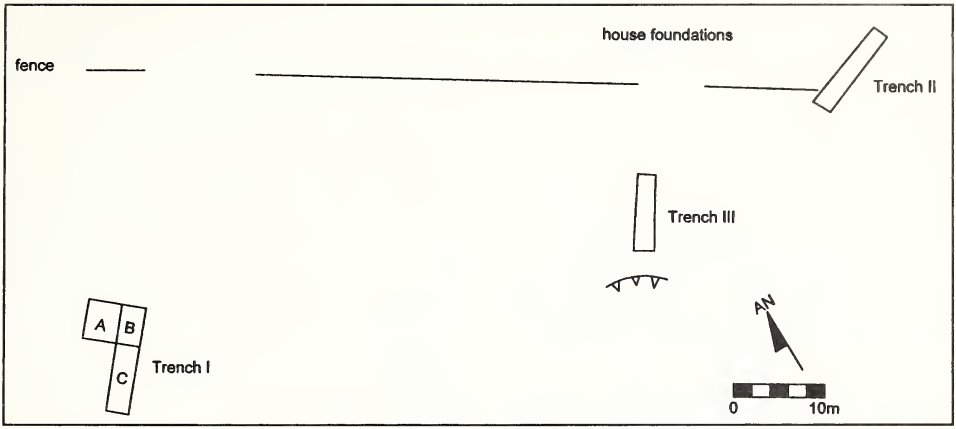

Fig. 12. Plan of Site 2429AA61.

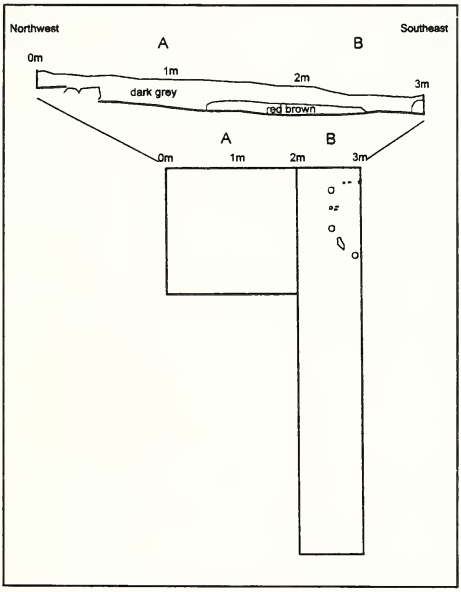

Fig. 13. Plan and north section of Trench I in 61.

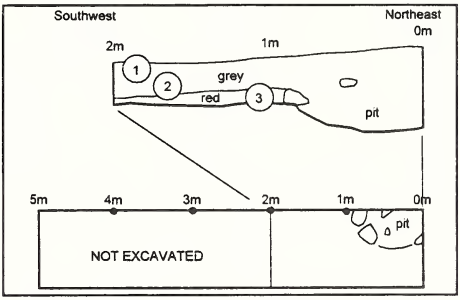

Fig. 14. Plan and north section of Trench II in 61.

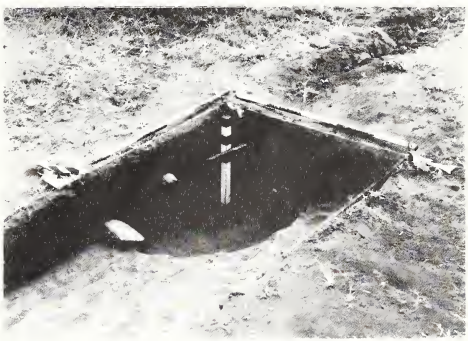

Fig. 15. Trench II in 61 showing storage pit. Note upper grindstone on left edge of pit.

cantly, a specularite quarry exists on a hill about 4 km west of Planknek. Consequently, the excavated samples will be of interest to any future research on iron smelting in the area.

Some of the metal working must have been done by Ndebele living in Site 59. Fortunately, Loubser's (1994) Ndebele research in the Pietersburg area clarifies the Late Iron Age sequence at Planknek. His Group II sites were concentrated on the north sides of hills. Because Ndebele normally did not re-occupy an old site out of respect for the ancestors, later Group III sites were therefore built

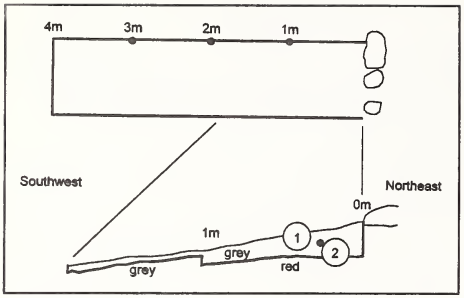

Fig. 16. Plan and east section of Trench III in 61.

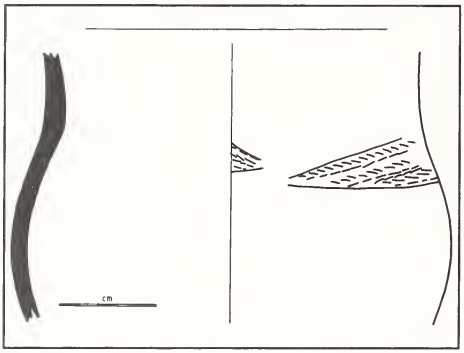

Fig. 17. Eiland pottery from site 2429AA60.

on the south side (Fig. 18). The locations of Site 59 (Group II) and 61 (Group III) follow this scheme. Indeed, even the cattle lanes on the south side that lead up to the top of 61 do not continue over the top to 59. The later people on the south side, then, appear to have avoided the older settlement.

By the beginning of the 19th century and the occupation of Site 59, the Ndebele had incorporated various people. The Letaba pottery in the middens of Area A shows that some of these people had connections with the Venda and the eastern lowveld. In Loubser's study, only important settlements contained Letaba pottery and only important settlements were located on the hills. Site 59 must have therefore been the settlement of an important leader.

Before the time of Site 59, the Northern Transvaal Ndebele lived in the Waterberg. Aukema's (Huffman 1990) research dated that occupation from the 16th to 18th centuries and shows that the Ndebele still used a material culture typical of Nguni speaking people, such as bee hive huts and plain hemispherical pottery. Furthermore, the pattern of stone walling, although based on the Central Cattle Pattern, was also visually different from Sotho-Tswana variations.

After these Ndebele moved east out of the Waterberg, they became 'Sothoised', their settlements lost some of the distinctive Nguni features and they adopted Sotho-Tswana material culture. This process of Sothoisation is of interest to social scientists, and is the reason we tried to locate a burnt hut in the residential zone of 59D. We wanted to know if the bee hive form still persisted.

Another feature points to the probable Nguni origins of these Ndebele. Alternating layers of crust and ash in middens have not been recorded in stone-walled sites identified with Sotho-Tswana speakers, such as Olifantspoort (Mason 1986). Yet Loubser (1994) found this feature in his Ndebele sites near Pietersburg. This difference may be due to different attitudes Nguni and Sotho-Tswana have about witchcraft and ritual pollution - a state of impurity and danger. Sotho-Tswana refer to pollution in terms of 'heat': hot is bad or dangerous, cold is good (Pauw 1960; Hammond-Tooke 1981). To remove the pollution Sotho-Tswana use cool and wet medicines that often include white ash. Since ash after a fire is cold, ash heaps are not ritually dangerous. Nguni-speaking people, however, refer to pollution as 'dirt', and ash heaps are potentially dangerous because witches could take the ash and cause harm to the household that produced it (Raum 1973:146). Ideally, a single homestead should have only one midden to prevent witchcraft accusations between different households. Furthermore, the midden should be located in public view at the front of the settlement.

In the case of Planknek several different households lived together, and the potential for witchcraft accusations must have been high. Periodically capping the ash heaps with soil would have helped to lessen this potential and its destructive affects. Further research into Nguni ethnography is needed to clarify this custom.

This new direction for future research demonstrates the success of the mitigation measures. Not only have the excavations yielded sufficient material for future research, the stratigraphy of the middens at 59A provide data relevant to an interesting research topic.

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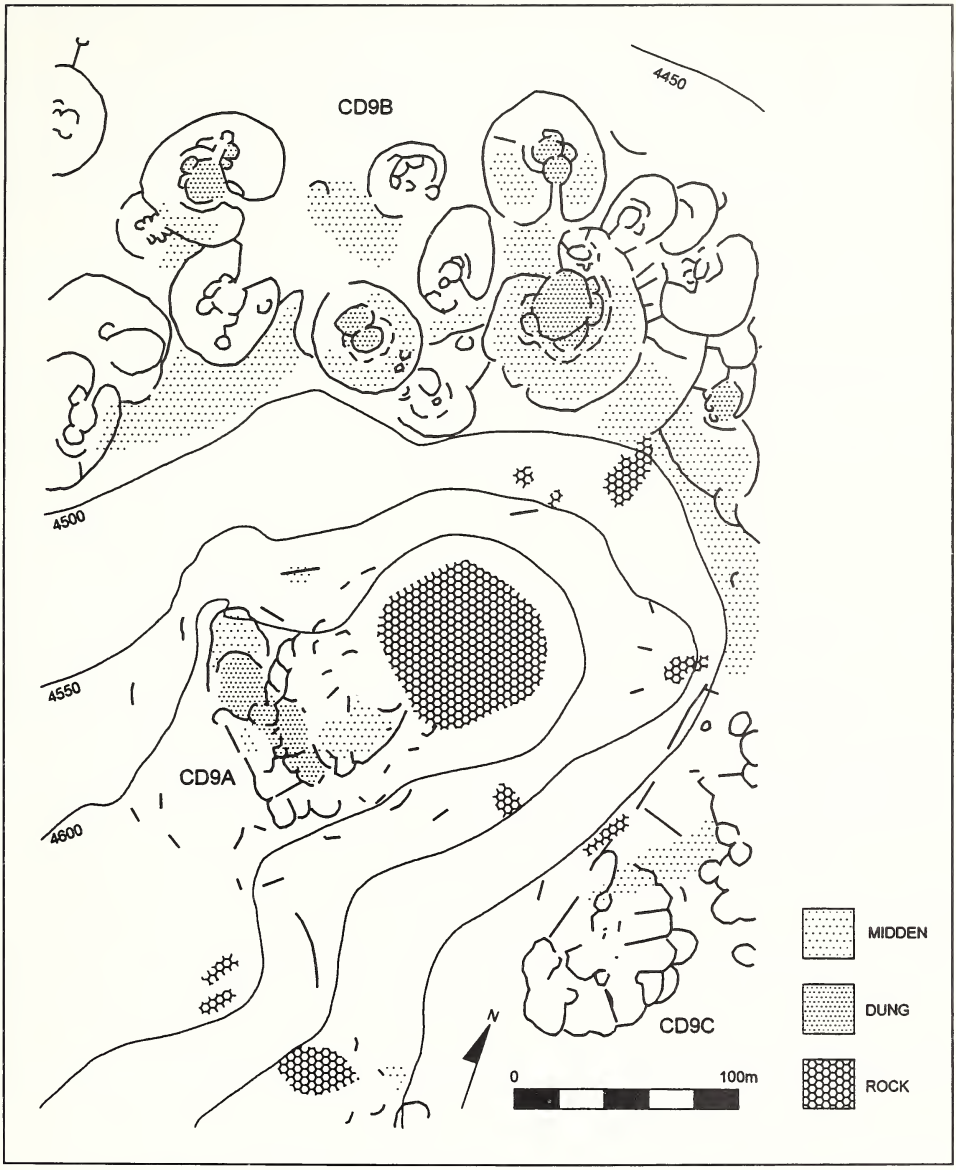

Fig. 18. Group II (CD9B) and Group III (CD9C) sites around Bambo Hill near Pietersburg. After Loubser 1994.

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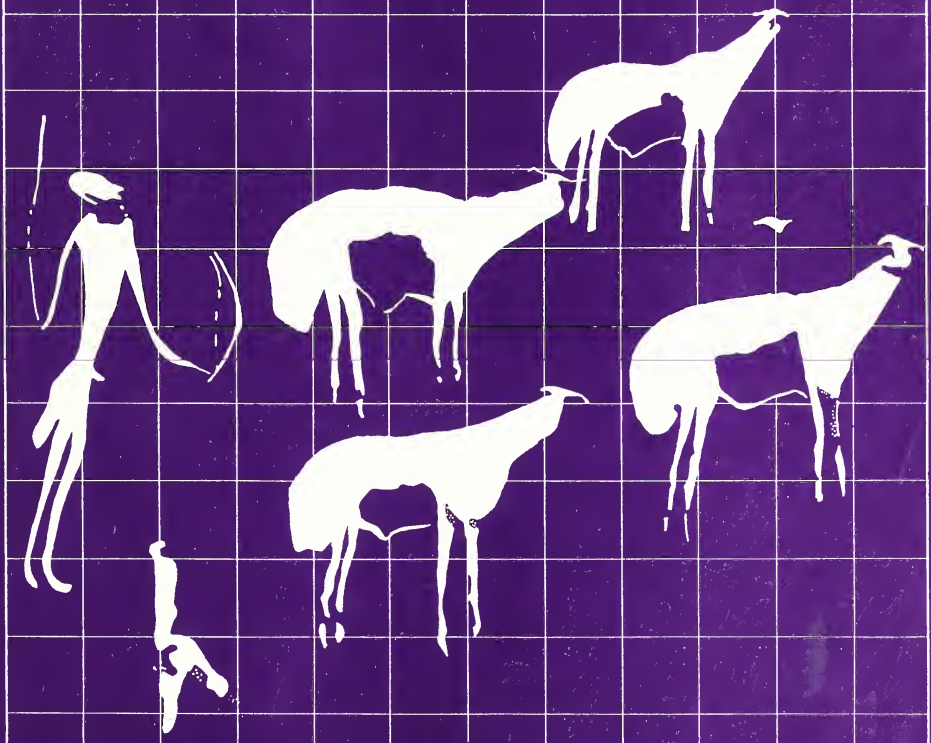

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Fat-tailed sheep from Edmondburg Sheep Shelter, Limpopo River valley, p. 59.

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OPINIONS

ARCHAEO-TOURISM AND IMAGES OF AFRICA

Having just officially emerged from the grips of colonialism, South Africa is now faced with the dilemma of both inviting and rejecting a re-colonisation of the country by archaeo-tourists.

At the heart of the impasse lies the danger of pandering to, and even accepting, an image of Africa that consists of unspoilt natural places with abundant herds of game and which is largely devoid of people. When people are foregrounded it is most often as an 'authentic' and culturally ingenuous ethnic groups. Yet it is the archaeo-tourist who offers the best hope of maintaining and sustaining our archaeological resources. Southern Africa's abundant archaeological resources have remained largely unnoticed by local residents who either take them for granted or who are, as a result of a divisive education system and society, largely unaware of the value of these resources. It is therefore ironic that the current value of southern Africa's archaeological resources is largely ascribed by a numerically small group of often non-resident archaeo-tourists. These archaeo-tourists will also argue that the revenue they enable will help South Africa come to terms with its turbulent democracy.

This turbulent democracy is, however, the last thing the archaeo-tourist wants to be aware of as it is an undeniable reality that exposes the fiction of the pristine

Africa image. The contradiction between reality and stereotype may lead the notionally politically correct archaeo-tourist to experience feelings of guilt. These guilt feelings may arise because the archaeo-tourist realises that her or his presence represents a re-colonisation of Africa and that, once again, the cultural achievements of Africa are being compared to a Western-European standard. Once again, local residents become victim of a dependency syndrome whereby we have to pander to dis-located images of southern Africa in order to access archaeo-tourist revenue. Furthermore, the cash-based authority of the archaeo-tourist's distorted image of southern Africa may become entrenched and concept-forming; thereby denying many local residents the opportunity to ground their lives in the context of own owned history and self-knowledge. It may, however, be possible to both manage archaeological resources and overturn stereotypes of southern African archaeology by pre-senting select archaeological sites in an arresting and challenging way.

I suggest the San rock art site represents an image of southern Africa that is well-positioned to both entertain and educate archaeo-tourists and local residents. Public rock art sites have been a persistent though low-level feature of the southern African landscape. In post-Apartheid South Africa the re-discovery of neglected archaeologies as well as the need for landowners to maximise their holdings' profitability have led to a dramatic increase in the development of public rock art sites. The higher visibility accorded this archaeological resource has both problems and potential.

As a fragile and non-renewable resource rock art, like all archaeological resources, requires a sustainable management plan. If landowners are taking the initiative (and the profit) to foreground rock art and other archaeological sites they, in partnership with vocational archaeologists, CRM consultants and facilitator organisations such as the National Monuments Council and ROCUSTOS, must also assume the moral and legal responsibility for sustainable site management. Developing rock art sites is neither difficult nor is it costly. The minimum requirements of a well-maintained sign-posted path, wooden boardwalk, interpretive noticeboards and access control can be implemented for as little as R2000-00, a fraction of the cost of re-furbishing a room in a Bed & Breakfast establish-ment. Though such an arrangement raises very real problems of under or no staffing, money and time at most archaeological hubs, it is also a public arena in which archaeology can demonstrate its social relevance.

Unlike many other archaeologies, the visual primacy and immediate authenticity of San rock art sites make them ideal vehicles by which to engage and educate archaeo-tourists and local residents. The visual impact of rock art sites may be enhanced by using professionally produced redrawings and short, informative text at the site so that it becomes a space of authority within which it is possible to sensitise viewers to a southern African visual practise and history very different from that with which the are familiar. Granted, this process privileges archaeological images of southern African history but as concept and identity-forming practise, archaeology is a powerful tool which may be used to counter a market-driven archaeo-tourist re-colonisation of southern Africa and promote an image of southern African history in local idiom that owes no allegiance to Europe. Such active and deliberate archaeological intervention is also necessary because the people who produced the rock art are absent, the victims of genocide, social strangulation and misarticulation with non-forager communities and are unable to prohibit or inform us about visiting their sites. The absence of these artist communities and the proxy which archaeologists assume should be forcefully presenced.

This problematising mode of rock art site presentation and management allows the site to be visited and re-visited by people as entertainment, education and a pricking of conscience. This uneasy alliance between satisfying archaeo-tourist's expec-tations and allowing them to overturn their stereotypical expectations of southern Africa is, I suggest, an appropriate metaphor for the search for a South African identity and is where a large part of the social relevancy of our archaeology resides.

Sven Ouzman
Rock Art Department
National Museum
Bloemfontein

Southern African Field Archaeology 5:59-69. 1996.

SHEEP IN THE ROCK PAINTINGS OF THE SOUTPANSBERG AND LIMPOPO RIVER VALLEY*

ED EASTWOOD

P.O. Box 168, Louis Trichardt, 0920

WARREN S. FISH

Schoemansdal Museum, Private Bag X2410, Louis Trichardt, 0920

*Accepted for publication March 1996

ABSTRACT

Paintings of fat-tailed sheep have recently been found in the Limpopo River valley, thus extending the range of known sheep paintings in the region. Subregional distribution of sheep paintings shows that fat-tailed sheep depictions are found in eastern Botswana, the Makgabeng and the Limpopo River valley, while in the Soutpansberg only paintings of thin-tailed sheep are found. Historical distribution and migration/diffusion patterns of Stone Age and Iron Age peoples are suggested to account for this phenomenon. The juxtaposition of sheep depictions with 'non-real' images points to ritual trance as the inspirational force behind these paintings.

INTRODUCTION

During the course of a survey of rock art sites in the Limpopo River valley, two shelters containing depictions of fat-tailed sheep were found on the properties Hilda and Edmondsburg in the Venetia Limpopo Nature Reserve (Eastwood & Fish 1995). These sites are situated several kilometres south of the confluence of the Shashi and Limpopo Rivers and are the first record of sheep paintings in the Limpopo valley (Fig.1).

The distribution of sheep paintings in southern Africa, archaeological excavation as well as ethnographic and linguistic evidence have been used to demarcate the migration routes of Khoekhoen pastoralists moving southward from Mashonaland or further north (see Cooke 1969; Walker 1991; Barnard 1992).

The Khoisan of the Shashi-Limpopo area have a long history of interaction with Bantu-speakers, and this would imply a certain amount of acculturation. The introduction of sheep into the area would certainly have had implications for the San, probably including those of a ritual or symbolic nature.

Much of southern African rock art has been shown to be inherently religious and to have ritual connotations (*e.g.* Vinnicombe 1976; Lewis-Williams 1981). Although there is a marked degree of uniformity in the sub-continental art, there are also regional differences (Lewis-Williams 1995:5). Despite these differences several researchers have suggested that the shamanistic explanation advocated by Lewis-Williams (1981), who worked in the Kwazulu-Natal Drakensberg, can be extended to interpretations of the art elsewhere, for example the south-western Cape (Maggs & Sealy 1983; Yates *et al.* 1985; Deacon 1988), Lesotho (Ouzman 1995), the Free State (Loubser 1993; Ouzman 1995), Namibia (Kinahan 1991) and Zimbabwe (Huffman 1983; Garlake 1987a, 1987b, 1989, 1990). Most of these researchers applied this paradigm to limited samples of regional art.

The similarities between the religious beliefs and rituals of all San groups in southern Africa whose ethnographies have been documented, and certain traits in widely distributed rock art images have led to a widely accepted hypothesis that, although these motifs are polysemic, the art is essentially shamanistic in origin (Lewis-Williams 1995:5). However, a simple and direct transposition of this hypothesis to interpret all the Soutpansberg and Limpopo valley art is not tenable, since a large proportion of the images do not appear to be trance-related.

Huffman (1983) extended this shamanistic model to include the rock art of Zimbabwe. He described a panel of sheep and human figures where he illustrated that sheep are a likely component of a trance scene and are thus exploited as religious symbolism. Some paintings of domestic sheep in southern Africa have been suggested by Manhire *et al.* (1986:26, 28) to be shamanistic in conception and the product of stressful conditions initiated by competing immigrant groups.

In this paper we speculate on the reasons for the exclusive depictions of the thin-tailed sheep in the Soutpansberg and fat-tailed sheep in the Limpopo River

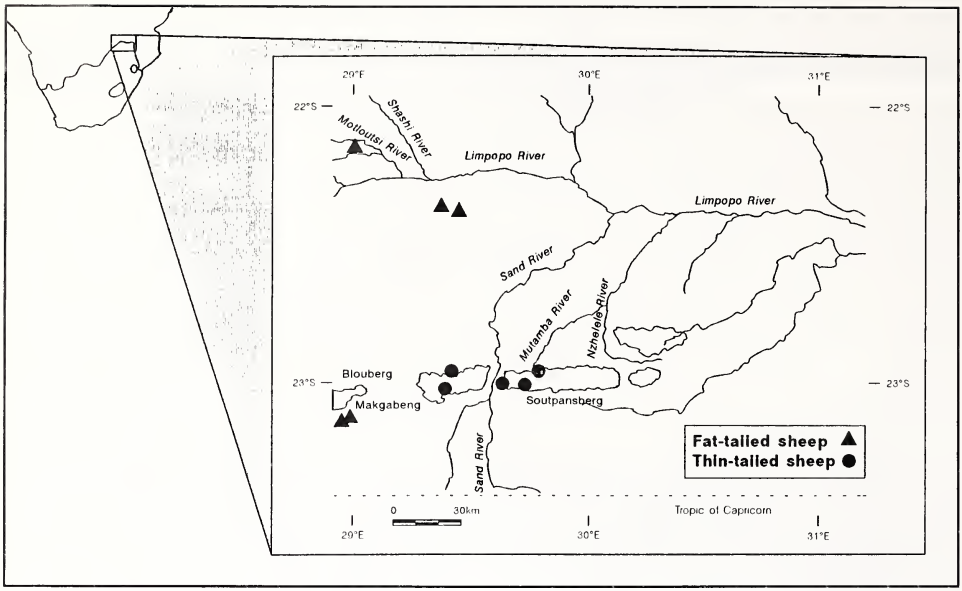

Fig. 1. Map showing the distribution of thin- and fat-tailed sheep paintings.

valley. Although the main focus of the paper deals with interaction and the distribution of sheep paintings, we have also shifted to the unrelated realm of ritual and belief because of the associations of the sheep paintings with other subjects. The juxtaposition of sheep depictions with other figures such as polychrome humans and geometric abstracts, the feature of an additional limb on a giraffe, and the remarkable postures and floating aspect of some of the human figures, all point to ritual trance as the inspiration behind this component of the art.

AN INTERACTIONARY PLEXUS

The presence of sheep paintings in the Soutpansberg-Limpopo area points to interaction between hunter-gatherers and pastoralists. A brief review of protohistoric and historic data of such interaction in the subregion is provided as a theme within which the distribution pattern of thin- and fat-tailed sheep paintings may be explained. The relationship between the theme of interaction and the shamanic associations of the sheep motifs is tenuous and problematic owing to the paucity of ethnographic material on the ritual and belief systems of the San in this region. However, the universality of the healing dances among diverse groups of hunter-gatherers has led us to consider the sheep and associated images as interactive ritual representations.

Dornan (1925:66) lists two groups who occupied the Limpopo and Shashi areas. The first was known as the Mapani Masarwa who inhabited the mopani woodland area on the border between the Bechuanaland Protectorate (Botswana) and Southern Rhodesia (Zimbabwe) and included the Hietchware San. The second group were known as Baduruwane, who inhabited the country on both sides of the Crocodile River. Early travellers and writers mention the "Vaalpens", a name given to indigenous Bush peoples inhabiting the Waterberg and the area from the Soutpansberg to the Limpopo. These groups were categorised as either hunter-gatherers or as being clients of the Tswana (Van Schalkwyk 1985).

The extant San in eastern Botswana are now categorised as the Eastern Khoe-speaking San. This includes the Hietchware or Tshwa San of eastern Botswana (Barnard 1992:117-119). The characteristic of these "Eastern" groups is their association with herding peoples and their high degree of cultural and spatial hybridisation (Barnard 1992:117).

The most unusual feature of the Eastern Khoe San is the practice of circumcision and the existence of totemism which indicates some cultural flow. Totemism is widespread among San groups in the Okavango and Kalahari fringe areas suggesting an early origin and is considered to be aboriginal to both San and Bantu-speakers (Cashdan 1979, in Barnard 1992:126).

Dornan (1925:54, 136-137), who despite confusing custom and group in many instances, described an "Eland Bull Dance" which according to Barnard (1992:130) refers to an Eastern Khoe San medicine dance. This is the only evidence we can find of any reference to trance dancing indicating the possibility that the Eastern Khoe maintained some measure of independent ideology. More ethnographic research on the ritual practices of the Shashi

San and related groups would be useful in determining the extent of cultural flow. The Eland Bull dance of the Kalahari !Kung and Naron is detailed by Lewis-Williams (1981:43-53) and is a girl's puberty ritual performed during her first menstruation. In this dance the women and older men dance around the girl who is secluded in a hut, imitating the movements of mating eland. In contrast to this Dornan's description closely resembles ethnographic accounts of the healing dances of Kalahari San (*cf.* Guenther 1976; Katz 1982). Despite the paucity of ethnographic data on the Shashi San, other Khoe-speaking San groups such as the Nharo (Barnard 1979) and G/wi (Silberbauer 1965) are reported to perform trance rituals for the purposes of healing.

Very little is known of the ideology and cosmology of the Shashi San. However, Cashdan has completed extensive research further to the north in the Botletli River area on territoriality (1983; 1984), competition between San foragers and Bantu-speaking food producers (1986) and trade (1987). Extensive evidence exists of interaction between the San and Bamangwato, Kalanga and Tswana in the region (Dornan 1925; Barnard 1992; Cashdan 1983, 1984, 1986, 1987; and others). Apart from trade the Eastern Khoe have contractual hunting arrangements with Bantu speaking agro-pastoralists and to avoid such matters as stock theft the practice of "mafiso" was adopted, whereby the San herded stock in exchange for animals of their own. According to Venda and Sotho informants this practice was also evident in the western Soutpansberg between pre-Singo groups and the San (Prins, pers. comm.).

Apart from a brief mention by Dornan (1925:66) the Shashi San are not discussed in the literature. Alec Campbell (pers. comm.) confirms this paucity of information and maintains that the Shashi San have been completely assimilated by the local Tswana and only a few of the older people still speak their ancestral Khwe.

Generally, the San of the Kalahari fringe have not been recently acculturated and possess a hybrid culture of some antiquity, beginning over 1000 years ago (Denbow & Wilmsen 1983). Early contact is also suggested by *in situ* finds of LSA associated artefacts in Early Iron Age sites (see Maggs 1980, 1984; Mason 1986; Whitelaw 1993; Fish 1995). Further evidence for close interaction is the description of an Early Iron Age skeleton excavated at Happy Rest in the western Soutpansberg which shows both negroid and Khoisan characteristics. The manner of its burial indicates a person of high social status (Steyn *et al.* 1994). A human burial excavated by Whitelaw (1993) at Nanda in Kwazulu-Natal described by Morris (1993) exhibits Khoisan features in a predominantly negroid specimen.

The existence of the Khoekhoen in the Limpopo valley has been postulated by Ehret (1982:163) using linguistic research. Their existence has been inferred from loan words in proto-Southeast Bantu ancestral to the Sotho, Tsonga and Venda languages amongst others. Further evidence for a Khoekhoen presence in the northern or central Transvaal (Northern Province) is derived from sets of loan words in proto-Shona. The spread of Shona into Zimbabwe can be attributed to settlers moving from the Transvaal at the end of the Early Iron Age (Huffman 1978), and contact is thought to have occurred in the Limpopo valley. Suggested approximate dating place the Khoekhoen in the Limpopo area at about the beginning of the first millennium AD (Ehret 1982:166).

The linguistic theories of Ehret (1982) regarding the Khoekhoen in the Limpopo valley are, however, not backed up by any archaeological evidence. Bambata pottery, for example, has been argued to indicate a Khoekhoen presence in the Matopos, but Huffman (1994:3-9) convincingly showed it to have originated in mixed farmer contexts.

SUBREGIONAL DISTRIBUTION OF FAT-TAILED AND THIN-TAILED SHEEP PAINTINGS

Apart from the Limpopo valley records, fat-tailed sheep paintings are found at five sites in the Makgabeng area in the Northern Province (Boshier 1972) and at two shelters in the Thuni-Motloutsi River area of eastern Botswana (Walker 1991) (see Fig. 1).

Both San and Khoekhoen are reported to have inhabited the Blouberg-Makgabeng area (Boshier 1972). Khoe-speaking San groups such as the Hietchware are found in eastern Botswana and in the Shashi-Limpopo area. Flocks of fat-tailed sheep can still be seen in the Makgabeng and in the Maramani Communal Land which lies adjacent to the Limpopo and Shashi Rivers in south-western Zimbabwe.

Paintings of thin-tailed sheep are found at five out of twenty sites in the western Soutpansberg, namely Goro II, Salt Pan, Sand River I, Leek and Aintree II. Sheep were thus an important component of the western Soutpansberg art (Eastwood & Cnoops 1994:48).

The San in the Soutpansberg are reputed to have lived harmoniously with pre-Singo groups but were displaced with the unification of proto-Sotho, Mashona and VhaNgona by the Singo roughly 300 years ago (Eastwood & Fish 1996:5; and see Loubser 1991; Hanisch 1994 for a description of early Venda history). Records kept by early European travellers and hunters do not specifically mention the presence of San groups in the Soutpansberg. It is thus reasonable to assume that depictions of thin-tailed sheep in the western Soutpansberg date to the precolonial period and probably to before Venda unification under the Singo.

Although Early Iron Age migration routes are thought to have traversed areas of the Limpopo River valley (Huffman 1989:161), to date no such settlements have been found there. Early Iron Age sites are known from the Soutpansberg for example at Happy Rest (Voigt & Plug 1984; Steyn *et al.* 1994), Klein Afrika (Prinsloo 1981) and Nandoni (Fish 1996). Early Iron Age migration brought with it domestic sheep and ovid remains were recovered from Happy Rest in the western Soutpansberg dated to 350 AD (Voigt & Plug 1984).

This link between Early Iron Age sites and thin-tailed

sheep paintings on the one hand, and evidence for a Khoekhoen presence and fat-tailed sheep depictions on the other, may indicate from whom the different San groups acquired their stock. This idea is reinforced by Epstein (1971 Vol. 2:156, in Voigt 1983:51) who mentions the possibility that early Bantu-speaking peoples obtained fat-tailed sheep from contact with the Khoekhoen but that they initially possessed only the thin-tailed variety.

This would seem to explain the distribution of depictions of thin-tailed and fat-tailed sheep in the far Northern Province. Other factors lead us to believe, however, that this scenario is much more complex than it would initially appear. No osteological differences have been found between the two varieties of sheep, so identification of one variety as opposed to the other from faunal samples recovered from an archaeological context is impossible at this stage. Scientists are currently researching DNA samples from sheep populations and it appears as if both thin- and fat-tailed sheep were present in southern Africa for roughly the last 2000 years (Plug, pers. comm.).

Another avenue which may have clarified this issue is the possibility that distribution of the two varieties of sheep may have been a function of differential feeding strategies. However, there is no evidence for veld-type preferences (Küsel, pers. comm.).

DESCRIPTION OF THE PAINTINGS

The Limpopo Valley sheep

Edmondsburg Sheep Shelter is found high up on an east-west trending ridge consisting of a lower Clarens Member and capped by a Tshipise Member of the Karoo sediments. These formations have been metamorphosed by intrusions of dolerite dykes. The shelter is c. 36 m long and is fairly shallow and faces north. The paintings are found on two adjacent panels and are illustrated in Figures 2A, 2B and 2C.

The right-hand panel depicts four fat-tailed sheep and two human figures. The large human figure to the left is wearing a loin-cloth or apron and carries a bow (Fig. 2A). The left-hand panel shows an antelope and a group of seven human figures, presumably all male, four of them with head extensions or headdresses and three painted in red and white bichrome. An elongated figure with robust calves in the centre of the group is shown in a kneeling posture (Fig. 2B). To the left of the group of men is a large animal, presumably an elephant, faced by the smaller figure of a hunter with bow and arrow (Fig. 2C). This rather amorphous animal was identified as an elephant because of its similarity to clearer depictions found in many parts of the area, usually having a black or white body and a distinct red dorsal stripe. This stripe can clearly be seen at the top of Figure 2C.

Although these two panels are adjacent it does not necessarily mean that all the motifs are linked specifically to the sheep. However, Cooke (1969:106-107) mentions the connections between sheep paintings in Zimbabwe with unusual images of humans painted in more than one colour, and they are rarely depicted carrying weapons. Another interesting feature is that bichrome human figures are not found at any of the 90 sites seen by the authors in the Limpopo valley, nor recorded in the field notes of Harald Pager in his survey of Limpopo sites in the 1960s and 1970s (Pager n.d.).

Three of the human figures in this shelter are painted in red and white bichrome, and the kneeling figure appears to be painted in the same dark red pigment as the sheep. The styles of each panel differ, but the left hand panel shows several styles: for example the monochrome yellow antelope and humans; the bichrome figures with headdresses; the elongated red monochrome figure and the hunter with the polychrome 'elephant'.

The Hilda I site is situated in a large shelter consisting of cream-coloured Tshipise sandstone. Figures 3A and 3B are from the same panel. The depictions illustrated in Figure 3A consist of a row of human figures either holding hands or carrying objects between them, and all have aprons or loin-cloths. Below this is a clear depiction of a fat-tailed sheep. To the left is another incomplete painting of a fat-tailed sheep which appears to have abnormally long hind legs (Fig. 3B). At the extreme left is a giraffe which apparently has three front legs.

The Soutpansberg sheep

For the purposes of this discussion sheep paintings from Goro II and Salt Pan are chosen to illustrate the possible religious significance of sheep.

Goro II shelter is situated on the farm Constance above the Goro stream high up in the Soutpansberg range. The shelter consists of typical pink quartzitic sandstone characteristic of the region. The painted panel consists of a number of human figures either with or without bows and arrows. The figures without weapons are in various postures, and one is superimposed on a sheep. At the lower centre of the frieze there is a sheep's head and to the extreme left is a large painting of a solitary sheep not shown in Figure 4.

Salt Pan shelter is found on the farm Soutpan. This is a large, deep and rounded shelter with evidence of deposit containing LSA microliths. There are many paintings in this shelter including human activity groups, finger lines and dots, oval grids and a number of schematic and zoomorphic fingerpaintings. The sheep and associated triangular motifs are isolated from the main body of paintings, are painted in the same red pigment and are c. 1,5 m apart, but are shown in close proximity in Figure 5. The hind legs of the sheep are slightly elongated.

SHEEP AND RELIGIOUS SYMBOLISM

The human figure associated with the fat-tailed sheep at Edmondsburg Sheep Shelter (Fig. 2A) and the line of humans at Hilda I (Fig, 3A) are wearing loin-cloths or a type of apron which covers the buttocks. These features are reminiscent of fat tails and are mentioned by Walker (1991:191) as a possible link between the men and sheep. This feature may represent a conflation of visual and

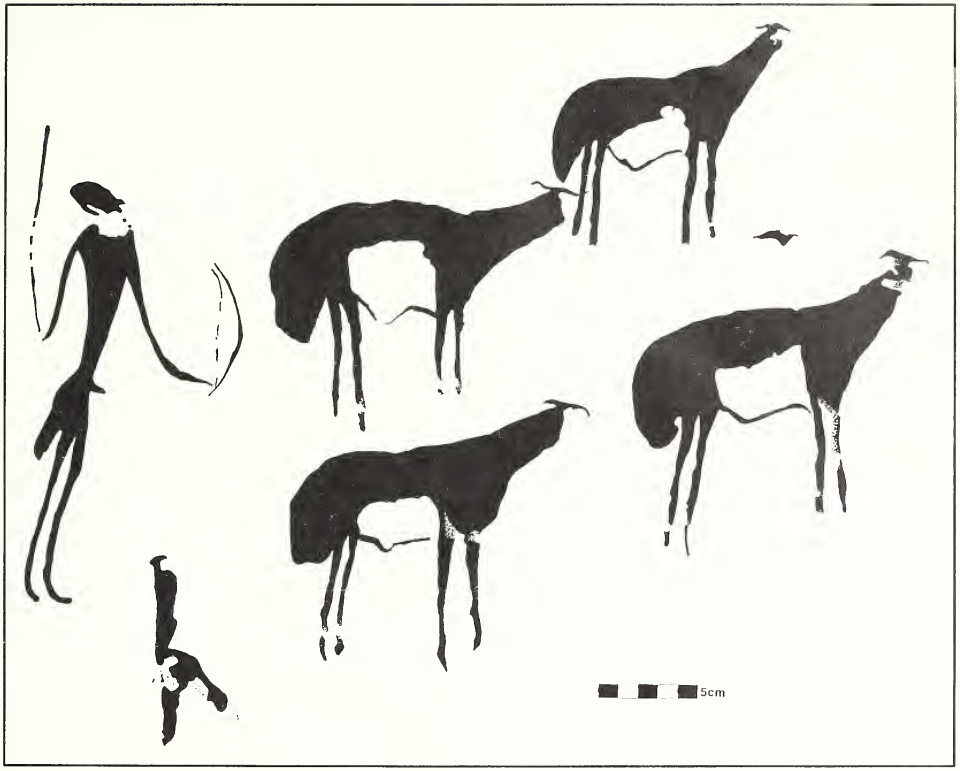

Fig. 2A. Fat-tailed sheep. Edmondburg Sheep Shelter, Limpopo valley.

somatic hallucination (see Katz 1982:237). Walker (1991:191) also mentions this connection with regard to the short forelegs and long hindlegs of some of the sheep depictions in Botswana. The greatly exaggerated legs of the sheep at Hilda (Fig. 3B) and the depiction at Salt Pan (Fig. 5) may illustrate trance-related metamorphoses. Attenuation in the art is considered to indicate the feeling of elongation while in trance (Lewis-Williams & Dowson 1989:76-77).

The activity group associated with the Edmondsburg sheep (Fig. 2B) also has the characteristics of a trance scene, namely the head extensions, distended and elongated human body and the elephant and hunter. Garlake (1987b:183-184) describes many types of additions to the heads of figures in the Zimbabwean art, and considers some of the literal explanations of other writers to be untenable. He suggests that they clearly represent standardised signs, understood within the culture, and may have signified different forms of potency, power, sickness, spirit travel or trance. The thick-set figure is not only elongated but has unnaturally distended calves. Both elongation and distension are associated with trance (Garlake 1987a:50-51; Lewis-Williams & Dowson 1989:76).

The accompanying large animal, or elephant and hunter may also signify trance performance (Fig. 2C). Garlake (1987b, 1989) describes a number of paintings apparently depicting the hunting of elephant in the rock art of Zimbabwe. He considers that the unreality of hunting such large animals with such flimsy and impractical weapons make these scenes more likely to depict ritual hunts. This is further supported by accompanying humans with head extensions and other characteristics of trance performance. These non-realistic images, he suggests, depict trance performance where the elephant is the trancer and the surrounding figures are those who assist and support the trancer. The hunter's arrow represents the metaphorical "arrows of potency" which are believed to be shot into the abdomens of aspirant trancers by *n/um* masters to regulate the activated potency necessary to enter full trance (see Katz 1982:46). An additional feature of the elephant is the presence of a red dorsal stripe which served as an aid in identifying the animal at Sheep Shelter. In a sample of 37 sites on the northern side of the Limpopo it was found that 62,5% of elephant paintings as well as several rhino

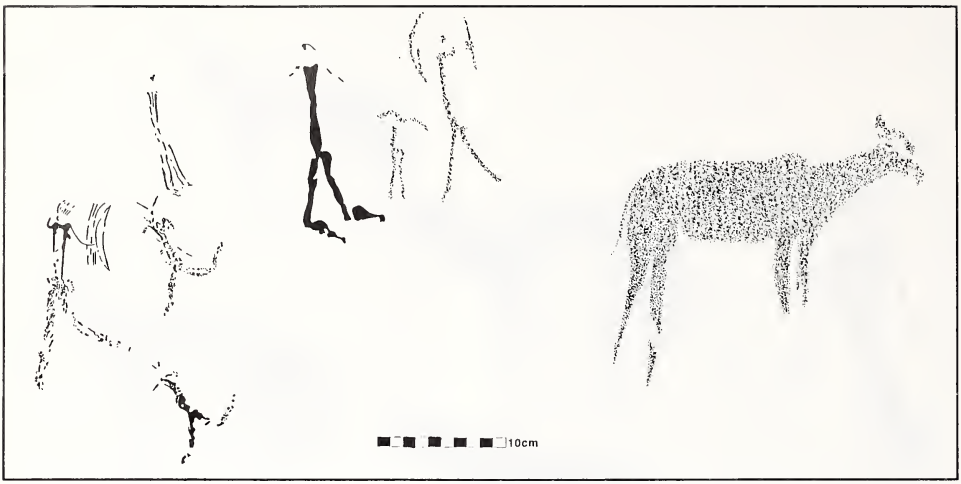

Fig. 2B. A yellow antelope and group of male humans. The three figures at bottom left are painted in red and white pigment. The central dark and red figure and bichrome figures have headdresses or head extentions. Edmondburg Sheep Shelter, Limpopo valley.

Fig. 2C. A large animal or elephant depicted in red, pink and white pigment. Note the red dorsal stripe. Edmondburg Sheep Shelter, Limpopo valley.

and giraffe displayed this feature (Eastwood *et al.* 1995:103-104). It has been tentatively suggested that the red dorsal stripe may be a metaphor for spinal potency (Eastwood & Cnoops 1993). It is well documented (*e.g.* Katz 1982) that activated potency rises along the spine during trance performance.

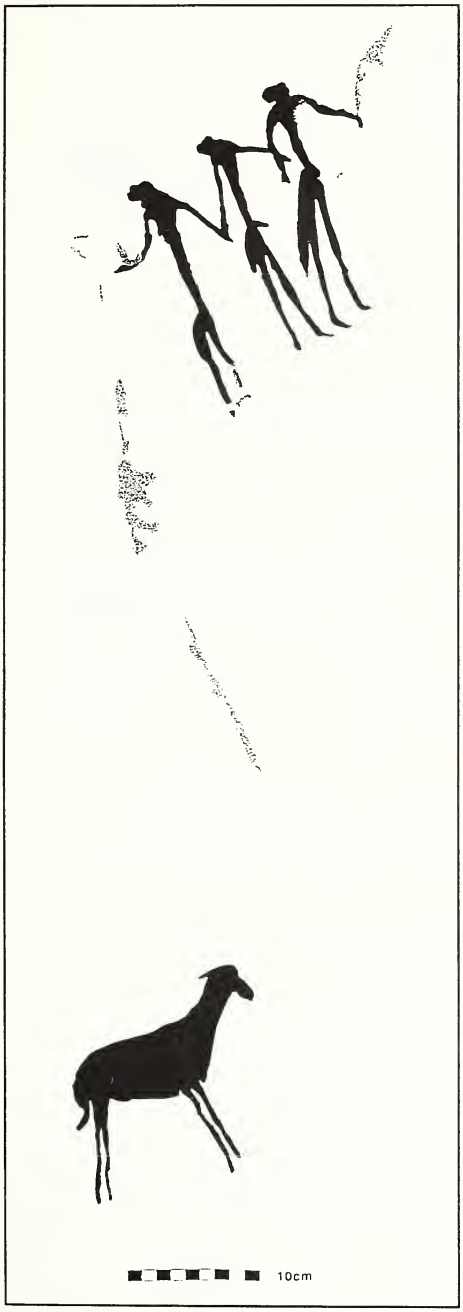

Fig. 3A. A line of human figures and a fat-tailed sheep. Hilda I, Limpopo valley.

The giraffe associated with the paintings at Hilda has a very distinct mane of erect hairs and also appears to have three forelegs (Fig. 3B). Erect body hairs on humans associated with sheep are also mentioned by Huffman (1983) and are said to signify trance. Additional limbs are also associated with the experience of trance (Lewis-Williams 1988), and Walker (1991:191) reports that one of the Thuni sheep paintings has an additional limb.

The large activity group associated with the thin-tailed sheep at Goro II (Fig. 4) contains several interesting features. Many of the men are without weapons and appear in a variety of postures such as outstretched and upreaching arms, falling forward and sitting, while two of the men armed with bows are lying down. One human is superimposed on the sheep. Superposition and juxtaposition of otherwise unrelated elements are, according to Lewis-Williams (1981:22), ways of altering or adding meaning to a painting. This whole panel would suggest a trance scene with the sheep as the central animal motif.

As mentioned previously, the sheep painting at Salt Pan (Fig. 5) appears to have slightly shortened forelegs and is associated with two triangles, one of which appears to have a human leg extending from its base. The meaning of these symbols and their association with the sheep are unclear but it certainly appears to be significant. These triangular or Y-shaped symbols are characteristic of the art of the Soutpansberg and Limpopo Valley. They are commonly associated with antelope, and human female or male activity groups. Accompanying human figures are sometimes elongated or in the bending-forward posture or have head or neck extensions suggesting trance performance. These motifs appear to have a range of possible meanings (such as symbols of fertility, menarcheal rites, trance potency or social metaphors) as well as complex associations, which are difficult to interpret (Eastwood *et al.* 1995:104).

The paintings of humans and sheep from Ruchera Cave, Mtoko in Zimbabwe are described by Huffman (1983) as evidently a trance scene where the sheep are a likely component of the ritual (Fig. 6). Garlake (1987a:76) described these paintings as consisting of a herd of twenty nine sheep. One of their "herders" has a protrusion on the chest and many white lines emanate from his head. A group of dancing figures is portrayed above the herd of sheep. In addition Huffman (1983:51) described some of the dancers as having erect hairs all over their bodies, others with snout-faces, infibulated penises or lines emanating from their heads. Despite the relatively large distance between Mtoko in north-eastern Zimbabwe and the Soutpansberg-Limpopo region, many of these paintings have strikingly similar associations.

A mention of sheep and Khoekhoen ritual is to be found in Schapera (1930:298-299) where sheep are slaughtered, and singing, dancing and praying take place after discovery of distemper in the flock. Another ritual is to drive sheep through a fire, which is construed to be efficacious in repelling the attentions of predators. Hoernlé (1985:75-76) mentions sheep being used in rain-

Fig. 3B. Remains of a fat-tailed sheep with elongated legs. The giraffe on the left has three fore-legs. Hilda I, Limpopo valley.

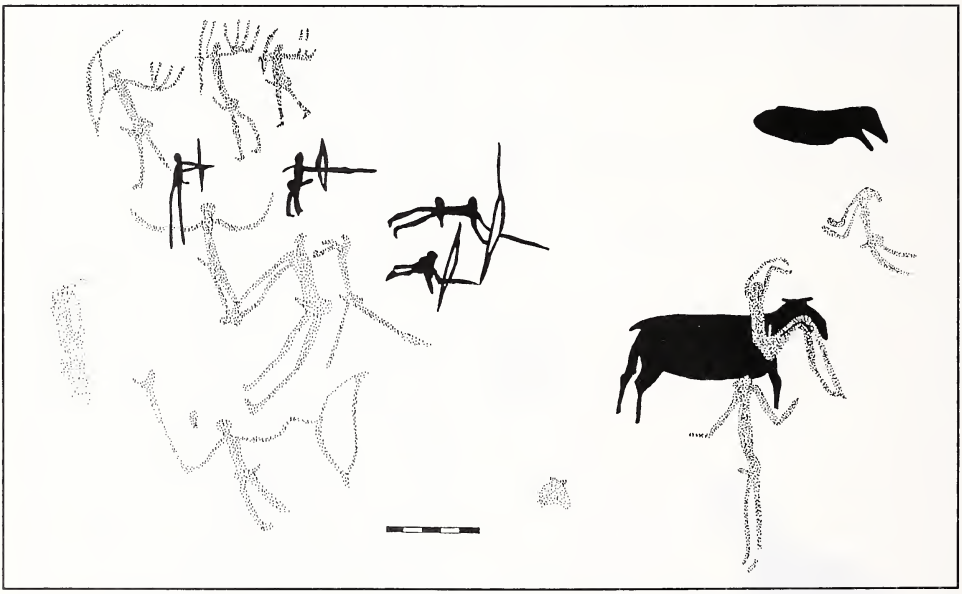

Fig. 4. A thin fat-tailed sheep and human males. (Black denotes red pigment and stipples are yellow pigment). Goro II, Soutpansberg.

making ceremonies by contemporary Nama.

Hunter-gatherer societies in the Kalahari are placed under high dietary stress during late spring/early summer seasons as carbohydrate supplies are depleted. As they begin to rely more on hunting they encounter increasing numbers of animals whose meat is lean. The intake of lean-meat results in a dietary need to increase lean-meat consumption to satisfy basal metabolic needs. (Speth 1987:18). The introduction of sheep into the study area could have resulted in a sustainable source of fat, even if such stock was not easy to acquire. Eland fat was regarded by the San to be a source of supernatural potency (Lewis-Williams 1981:50), and Huffman (1983:51) extended this to include the fat of sheep and suggested that this has contributed to sheep being exploited as religious potency symbols. He proposed that the sheep paintings are not likely to be simple scenes of herders, but complex statements about the control of

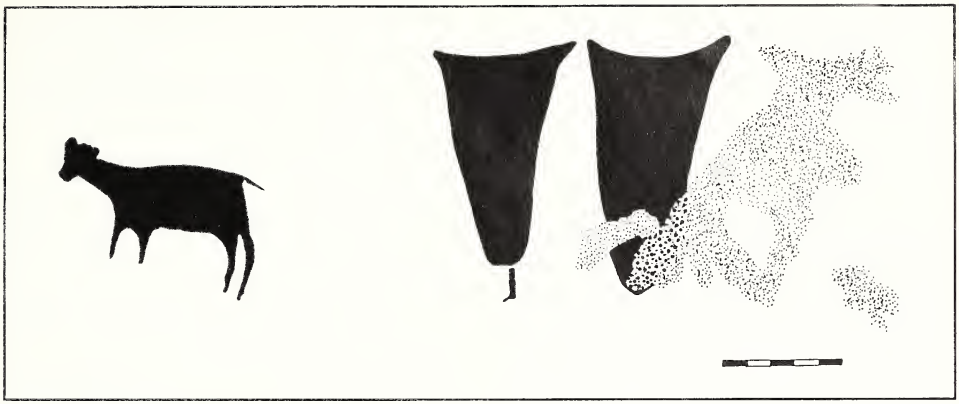

Fig. 5. A thin fat-tailed sheep and two triangular motifs. Salt Pan, Soutpansberg.

Fig. 6. A small section of the sheep paintings from Ruchera Cave, Mtoko, Zimbabwe. The male figure at the far left has hairs on his body which are not shown here. (Redrawn from Summers (1959:33, fig. 14)).

potency and are concerned with trance and medicine men.

In some cases Botletli River San groups were impoverished by immigrants and in others they prospered by adaptation to mixed farming technologies (Cashdan 1986:309-310, 314). The complexity of contemporary interaction may also be inferred for historical scenarios. In either case, one of the implications of stress set up by interaction and the resultant competition with more powerful immigrants would have been the intensification of ritual such as the healing or trance dance of the San (*cf.* Guenther 1976; Manhire *et al* 1986:28) and this in turn may have been represented in the art.

CONCLUSION

One of the major limitations to rock art interpretation in southern Africa is the absence of reliable sequential dating techniques. This is especially the case when trying to illustrate cultural process in rock art.

The distribution of depictions of sheep in the study area is interesting, with the thin-tailed variety found exclusively in the western Soutpansberg and the fat-tailed variety elsewhere in the region. The absence of Early Iron Age settlements on the Limpopo and the extensive presence of these sites in the Soutpansberg have led us to make a tenuous connection between the Early Iron Age farmers and thin-tailed sheep. The records of Khoekhoen migration routes and their historical presence in the Makgabeng and Limpopo River valley have likewise led us to believe in the possibility of the Khoekhoen/fat-tailed sheep connection. However, at this stage our knowledge is not extensive enough to draw any concrete conclusions from these data.

The subjects with which the images of sheep are associated have led us to infer by analogy that they may be considered in a ritual context. The transfer of the shamanistic model to interpret certain traits in the art of the Northern Province is beset with problems, and should be approached with caution. Nonetheless, the universality of the healing dances among diverse groups of hunter-gatherers in southern Africa and its connections to the art has led us to apply it to some of the images associated with the sheep. The value of sheep to the San as a sustainable source of fat, and the likelihood that these animals were considered to be sources of supernatural potency would have been a motivation to portray them in paint.

The stressful effects of interaction may also have resulted in intensification of healing dances, and this in turn would be reflected in the art. Taking into account the probably extensive cultural flow of ritual and world view of the San and their neighbours in the region, it seems evident from the sheep paintings and associated scenes that, despite contact, the San retained at least some of their ancestral ritual at the time that the paintings were executed.

The recurrent theme throughout this paper is interaction. On the one hand the interaction between peoples, resulting in the introduction of sheep to the San. On the other hand the interaction between the depictions of sheep and other animals, abstracts and humans. In both senses sheep are central to a network of connections, at the heart, so to speak, of an interactionary plexus.

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FAUNAL EVIDENCE FOR PASTORALIST SETTLEMENT AT JAKKALSBERG, RICHTERSVELD, NORTHERN CAPE PROVINCE*

JAMES BRINK

National Museum, P.O. Box 266, Bloemfontein, 9300

and

LITA WEBLEY

Archaeology Department, Albany Museum Somerset Street, Grahamstown, 6139

*Accepted for publication September 1996

ABSTRACT

Bone samples from the open sites of Jakkalsberg A and B are dominated entirely by remains of domestic caprines with almost no evidence for the hunting of wild game. These sites are situated on the edge of the Richtersveld National Park and the bone remains are radiocarbon dated to ca. 1300 years ago. In spite of the fragmentary state of the bones it is likely that all caprine remains in these assemblages belong to sheep, since there is no positive evidence for goats. In this study we publish measurements on sheep remains, which provide information on the body size of local breeds of sheep. Although there is a lack of suitable southern African comparisons, it appears that the Jakkalsberg sheep were quite large and long-limbed. It seems that almost all age classes of sheep are represented from new born to fully adult, but no old individuals. Some of the bones were stained with red ochre suggesting that the domestic stock may have been of some significance in the rituals of the inhabitants of the sites.

INTRODUCTION

Archaeological work in the Richtersveld, an arid region enclosed by the bend of the Orange River in the extreme north-western portion of the Northern Cape (Fig. 1), was initiated in 1990 in order to establish a time depth for the occupation of the region by the Nama-speaking descendants of the Namaqua Khoekhoen. The project was of more than academic interest. During the period 1989-1990 the South African National Parks Board was involved in negotiations with the inhabitants of the Richtersveld with the view to establishing a national park in the region (Boonzaier 1991). During initial negotiations it seemed as if the local inhabitants would lose access to a large portion of their traditional grazing area if they were not able to prove that they had "utilised the area for many centuries without the supposed degradation to the environment claimed by some" (*ibid.*:159-160).

Archaeological work at /Ai tomas (Webley 1992) and at Die Toon (Webley *et al.* 1993) was unable to support the claim for long term occupation of the area, because the faunal sample from the former site contained very few sheep fragments while the latter site predated pastoralism. The site of Jakkalsberg, first reported to the warden of the Park in April 1992, when a local herdsmen noticed that his goats and the wind had opened up a human burial, has provided the necessary evidence for early pastoralism in the area. The human remains were extremely fragmentary, consisting of parts of the skull, teeth, an upper arm and scapula, and have for this reason not been submitted for analysis. The milk dentition suggested that the individual was a juvenile of four or five years of age. The skull was stained with red ochre and a high concentration of ostrich eggshell beads around the skeleton suggest that they were associated. It is not possible, however, to link the burial with the occupation of the site.

Since this site was discovered only after the completion of the project mentioned above, its results had no impact on the signing of the contract for the park, which took place in November 1990. Nevertheless, the results of the June and November 1992 excavations at Jakkalsberg do support the claims to the land made by the local inhabitants.

Jakkalsberg A and B (28.10.50S; 16.53.15E) consist

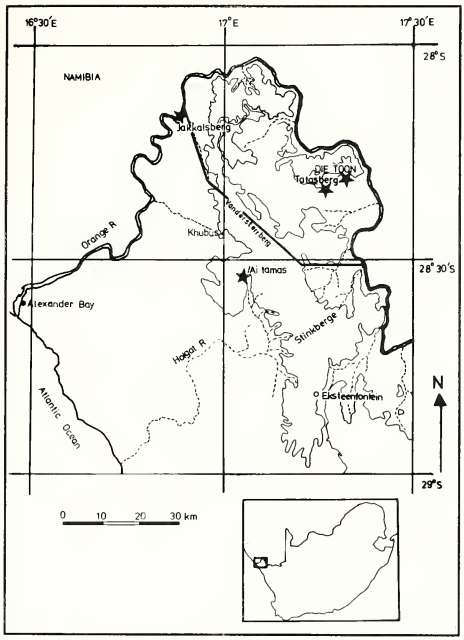

Fig. 1. The situation of the Richtersveld in the Northern Cape Region and the position of Jakkalsberg, /Ai tomas, Die Toon and other towns mentioned in the text.

of two sites some 40 m apart on the banks of a dry river course some 300 m to the south of the Orange River. The sites are less than 5 kilometres from the gates to the Richtersveld National Park and since the occupants of the site would, in prehistoric times, have travelled extensively along the river the second author of this paper approached the National Parks Board (NPB) for financial assistance in the excavation of these sites. The site was first investigated in June 1992 and the human remains collected. The burial is situated on the edge of a large open site (termed Jakkalsberg A) while a further concentration of material some 40 m to the southwest (Jakkalsberg B), partially buried under a small hill, was also recorded (Fig. 2). The sites consist of dense concentrations of pottery, stone, ostrich eggshell beads and bone. The bone (which included fish vertebrae), as well as several surface hearths, was in danger of rapid disintegration and a preliminary collection was undertaken. A more thorough investigation was undertaken in November 1992.

THE SETTING

The western portion of the Richtersveld is known as the Sandveld as it consists of a hilly dune landscape (100 - 400 m high) while the northern, central and eastern areas are very mountainous (some of the highest peaks reaching heights of 1300 m). The region is extremely arid and contains some of the only true desert in South Africa. Rainfall occurs mostly in the winter months and varies between 15 and 300 mm per year with an average of 125 mm. Daily temperatures in the summer months may reach 46 C (Kröhne & Steyn 1990). Droughts occur frequently and result in great stock losses among the small stock herders in the area. Nevertheless, the presence of the Orange River, which flows along the western, northern and eastern borders of the Richtersveld, means that the inhabitants have a constant source of water, particularly during the dry summer months.

The vegetation on the coastal plain is termed Strandveld (Acocks 1975) and is dominated by *Mesembryanthemacae*. Succulent Karoo occurs on the more hilly and stony eastern edge of the Sandveld. Namaqualand Broken Veld is found to the east of the central Stinkberge mountain range, while the highest mountains in the southern and central Richtersveld are covered in Western Mountain Karoo (Acocks 1975). The vegetation along the Orange River and around the permanent springs in the area consists of thick bands of trees and reeds. The trees include *Euclea pseudebenus*, *Tamarix usneoides*, *Rhus viminalis*, *Salix mucronata*, *Ziziphus mucronata* and *Acacia karoo*.

Historically, Hoernlé (Carstens *et al.* 1987) observed that the Little Namaqua Khoikhoi grazed their livestock on the Sandveld in winter and in the mountains around Khubus in summer. More recently, however, Mussgnug (1995) and Moolman (1981) have documented a variety of patterns of seasonal movement which would include utilising the vegetation along the Orange River during the summer months and particularly during drought conditions. Since the topographically diverse areas of the Richtersveld would have provided pastoralists with a variety of options in terms of seasonal mobility in the past, it is difficult to predict these movements with any degree of accuracy.

HISTORICAL OBSERVATIONS ON THE FAUNA OF THE AREA

Historical accounts attest to a rich diversity of game species in the riverine area. Eighteenth century travellers such as Wikar (Mossop 1935), Gordon (Raper & Boucher 1988) and Paterson (Forbes & Rourke 1980) did not travel along the Richtersveld section of the Orange River and their observations on the game along the coast and further down the river may not be as pertinent as those of Alexander (1967), Cornell (1992) or Hoernlé (Carstens *et al.* 1987) who travelled extensively in the Richtersveld proper in the 19th and early part of the 20th century respectively.

Alexander (1967) encountered a Namaqua group living on the banks of the river at Arriesdrif or Arris Drift (from the Nama //aris), some 40 km downstream from Jakkalsberg, in 1836. This settlement consisted of some twenty huts occupied by about one hundred people

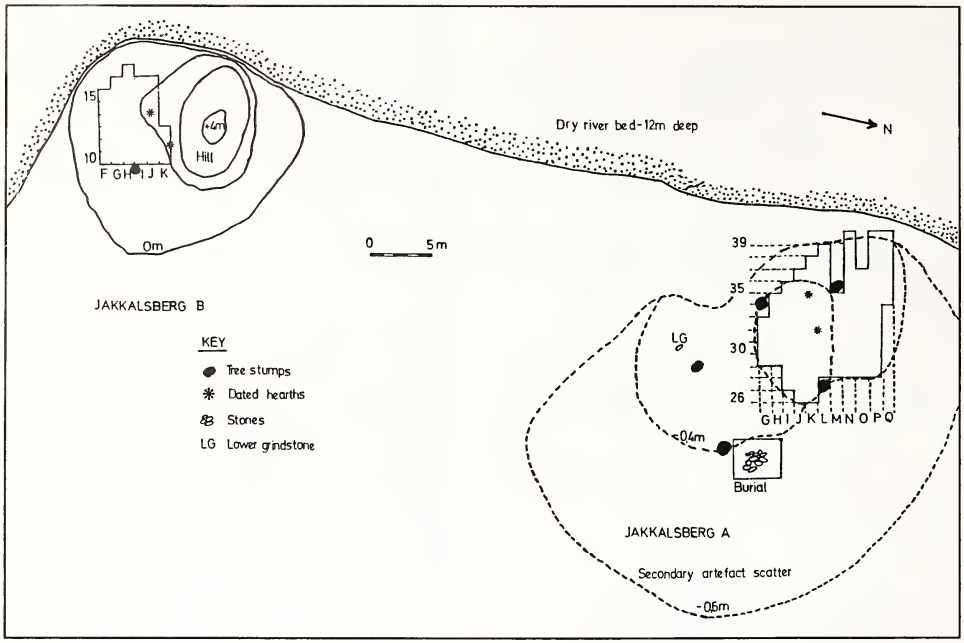

Fig. 2. Site plans of Jakkalsberg A and B.

"with flocks and herds" (Alexander 1967:111). According to Hoernlé (Carstens *et al.* 1987) this was the outpost of the people of Khubus during their summer migration along the Orange River. Alexander reported that apart from hippopotamus (*Hippopotamus amphibius*) and fish in the river, there were water fowl, ostriches (*Struthio camelus*) and eland (*Taurotragus oryx*) in the area. Cornell (1992) who prospected extensively in the region between 1910 and 1920 noted klipbok (*Oreotragus oreotragus*), dassie (*Procavia capensis*), zebra (*Equus* sp.), leopard (*Panthera pardus*), wild cat (*Felis* sp.) and jackal (*Canis* sp.) in the mountains, while along the densely wooded river area around Sendeling's Drift he remarked on the bush doves, hare (*Lepus* sp.), monkeys (*Cercopithecus aethiops*) and baboons (*Papio ursinus*). Hoernlé (Carstens *et al.* 1987) referred to the moorhen (*Gallinula chloropus*) along the river.

With regard to the fish species present in the river, Gordon noted the harder or springer (*Mugil cephalus*) but the identification of the moggel (or mud mullet) as *Labeo umbratus* by Boucher & Raper (1988) has been disputed (P. Skelton, JLB Smith Institute of Ichthyology pers comm.). The catfish, (*Clarius gariepinus*) and yellowfish (*Barbus aeneus* and *B. kimberliensis*) also occur in the river but were not specifically described by these historical writers. Historical sources are divided on the consumption of fish by the Namaqua Khoekhoen inhabitants of the region. Alexander (1967:153) caught some fish, including a 'moekul' and a large carp but when he gave some to the Namaquas, "they declined eating them, saying that they might be poisonous". Backhouse (1842:31), on the other hand, found some Khoekhoen women and children at a settlement on the coast near the present town of Port Nolloth, "frying and eating fish all day", suggesting that taboos relating to the consumption of fish varied considerably.

THE EXCAVATIONS

During the initial rescue operation at Jakkalsberg A the material from 81 square metres was collected and analysed at the Albany Museum. Subsequently, a further 18 square metres was collected from the surface of site A and a further 26 square metres was excavated to archaeologically sterile soils. There is no evidence for stratigraphic layering at site A and it appears that one is not dealing with successive occupations. With regard to the B site, the concentration of material is bounded to the north by a small hill and to the south and west by a dry river course (Fig. 2). Material from 38 square metres was collected and excavations were concentrated on those squares which abutted the hill and contained the greatest concentration of material. Hearths in these squares were superimposed one above the other, suggesting that re-occupation of the site occurred in the past.

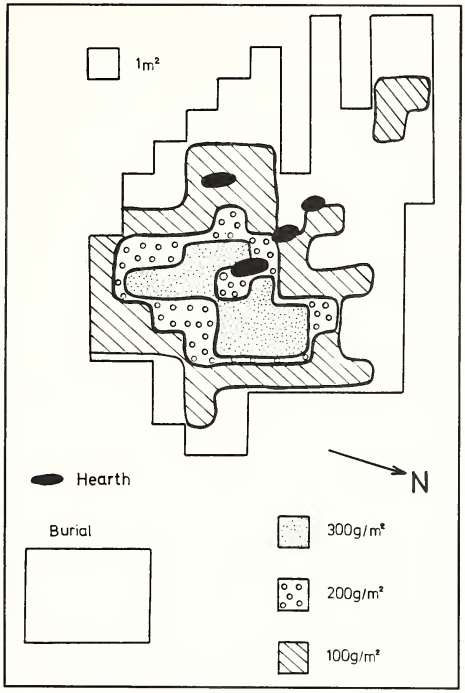

Fig. 3. Distribution of faunal fragments at Jakkalsberg A.

DATING OF THE SITES

A total of four hearths was uncovered at site A; Hearth 1 dating to 1330 ± 60 BP (Pta-5958), which calibrates to AD 664(691)783, and Hearth 2 to 1300 ± 25 BP (Pta-6100), which calibrates to AD 691(762)777 (J. Vogel pers. comm.). Both are from hearths only 4 m apart suggesting an 8th century AD occupation. Hearth 1 in K11 at Jakkalsberg B, partially wedged into the side of the hill is dated to 1420 ± 25 BP (Pta-6122), which calibrates to AD 640(652)660. Hearth 2, situated in the first occupation unit (MOU), dated to 1380 ± 50 BP (Pta-6101), which calibrates to AD 648(668)691 (J. Vogel pers. comm.). Sites A and B are separated by some 40 m but the radiocarbon dates confirm that they are contemporary.

ANIMAL REMAINS

The present analysis do not include non-mammalian remains. Although this study focuses on the exploitation of domestic mammals by the inhabitants of the two sites, it should be borne in mind that no final interpretation of the economy of the people can be made without the inclusion of all food resources.

Table 1. Jakkalsberg A: Taxonomic list of mammal remains in terms of mininimum number of individuals (MNI) and number of identified specimens (NISP).

	Surface	Sub-surface	Surface/Sub.
Leporidae indet. (hare)	1/3	-	1/1
**Hyaenidae* indet. (hyaena)	X	-	-
Ovis aries (sheep)	2/22	1/8	4/24
Ovis/Capra (sheep/goat)	8/326	4/114	2/6
Bovidae indet.:			
Small-medium	3/464	3/106	1/120
Large	1/3	-	-

* Coprolite

Note: In all three excavated units fish and tortoise remains occur. However, these remains were not submitted for analysis.

Table 2. Jakkalsberg B: Taxonomic list of mammal remains in terms of mininimum number of individuals (MNI) and number of identified specimens (NISP).

	Surface	MOU	MOU2	MOU3	MOU4
Leporidae indet. (hare)	1/1	-	-	-	-
cf. Equus quagga (plains zebra)	1/1	-	-	-	-
**Hyaenidae* indet.(hyaena)	X	-	-	-	-
Ovis aries (sheep)	3/16	1/1	1/2	1/1	1/1
Ovis/Capra (sheep/goat)	8/177	4/29	2/23	4/15	2/9
Bovidae indet.:					
Small	-	1/6	-	-	-
Small-medium	2/119	3/18	2/18	2/14	1/4

* Coprolite

Note: In all excavated units fish and tortoise remains occur. However, these remains were not submitted for analysis.

Method of analysis

The mammal bone samples from the two sites were identified and individual specimens were noted on bodypart lists according to stratigraphic unit and area. In the analysis of Jakkalsberg A a distinction between surface and sub-surface material is made (Table 1), whichreflects the method in which the material was excavated. It is not a chronological distinction, as discussed above. In Jakkalsberg B the sub-samples shown in Table 2 reflect true chronological distinction, as it is clear from the excavation that there were successive occupation events of the site.

Where the specimens were complete enough, measurements were taken according to the standard method of Von den Driesch (1976) with additional measurements taken according to Peters (1986) (Table 4a & 4b). In the context of southern African archaeozoology it is not yet a common procedure to publish measurements, especially not measurements on postcranial elements. However, we include these measurements as part of the basic documentation of the material. We also do this in the hope that it will become standard procedure. The publication of measurements not only increases the value of archaeozoological reports as secondary sources, but also provides the opportunity of

Table 3. Jakkalsberg B: Age profile of domestic caprines (sheep/goat)* based on teeth and given in terms of MNI.

	Surface	MOU	MOU2	MOU3	MOU4	TOTAL
New born	1	1	-	1	-	3
Young	1	1	1	1	-	4
Young-adult	1	-	-	1	1	3
Adult	3	2	1	1	1	8
Old	-	-	-	-	-	0
Total	6	4	2	4	2	18

* Since it is seldom possible to distinguish sheep from goat on individual teeth or even toothrows (Boessneck *et al.* 1964), the age profile does not make a distinction beteen sheep and goat. However, it is likely that all remains listed in this table are those of sheep.

Table 4a. Standard measurements on sheep remains from Jakkalsberg A.

Ovis aries

Scapula	GLP	LG	BG
Surface L34	30	24.8	(19.7)
-	29	24.7	18
Surface M28	32.3	28.1	(21)
Sub-surface M23	31.4	26.5	19.4

Humerus	BT	Bd	Dmd
Surface H31	29.3	32.4	27.8
Surface H32	31.4	33.5	29.4
Surface O29	28.6	31.9	-
Sub-surface G32	30.7	34.6	29.6
Sub-surface/Surf.	30.7	32.7	-

Radius	BFp	Bp	Dp	Bd
Surface	(30.3)	32.9	17	-
Surface	31.5	33.2	17.4	-
Sub-surface P34	-	-	-	33.4
Sub-surface/Surf.	29.1	30.5	-	-

Metacarpal	Bp	Dp	SD	DD
-	25.6	17	15.2	9.5

Tibia	Bp	Dp	Bd	Dd
Surface K35	41.5	39.3	-	-
Surface O33	-	-	28.6	21.5
Sub-surface Block1	-	-	28.7	21.9

Talus	GLl	GLm	Dl	Bd
Surface	29.5	29	16.8	18.8
Surface L28	33	32.1	19.2	21.2
Sub-surface	30.2	28.7	17.3	19.7

Calcaneus	GL	GB	Bp	DS	Dd
Sub-surface	60.8	-	14	17.9	23.9
Sub-surface	-	19.5	-	19.4	23.9

Distal phalanx	HP	BFp
Surface K33	15	8.1

Table 4b. Standard measurements on sheep remains from Jakkalsberg B.

Ovis aries

Scapula	GLP	LG	BG
MOU I15	32.3	26.4	22.2

Humerus	BT	Bd
Surface I15	30.8	32.7
Surface	30.9	33.3

Radius	BFp	Bp
Surface J15	33.6	36.3

Pelvis	LA
Surface J14	30

Talus	GLl	GLm	Dl	Bd
Surface	30.1	28.9	16.8	19.4

Centroquartale	GB	GD
Surface J12	22.9	20

bodysize estimation in animals. This in particular allows the possibility to diagnose breeds and to establish spatial and temporal trends in domestic animals. The need topublish metric data is underlined by the lack of information on the identity of various breeds of "indigenous" southern African domestic mammals from archaeological sites.

Faunal concentrations

Bone concentrations at the A site (Fig. 3) relate to the mass of fragmented bone recovered from each square. The densest concentration of bone (in excess of 300 grammes per square metre) occurs to the south and east of the four hearths plotted at site A and overlaps, only partially, with potsherd and stone artefact concentrations. Bone concentrations at the B site are less meaningful as the area sampled is much smaller and the bone is spread through several occupation units.

Taxonomic composition of the fauna

Tables 1 and 2 give an overview of the mammal remains from the two sites. The subsistence pattern, as reflected by the taxonomic list, is entirely focused on the exploitation of domestic caprines. The extreme fragmentation of material resulted in a very high proportion of specimens that cannot be identified as either sheep or goat. However, it is highly unlikely that any goats are represented in the assemblage, since no goat remains were positively identified. It appears that hunted animals played almost no part in the diet of the inhabitants of the site, except for the rare remains of leporids, which could be either *Lepus saxatilis* or *L. capensis*. The hyaena coprolites are not unexpected, since scavengers are known to visit human habitation sites after they are abandoned. It is noteworthy that hyaena coprolites are found on the surface of both sites, suggesting that the burial of the underlying units in

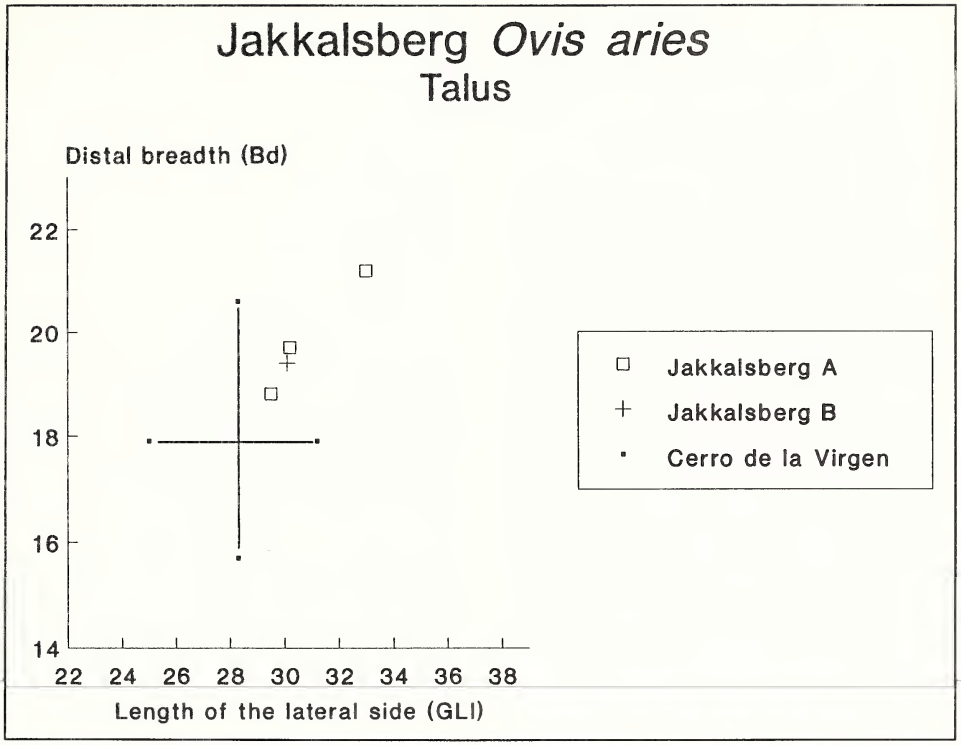

Fig. 4. A comparison of sheep tali from Jakkalsberg A & B and the Spanish site "Cerro de la Virgen". The length of the lateral side (GLI) gives an impression of shoulder height of sheep, while the distal breadth (Bd) is a reflection of robusticity. The two axes of the cross represents the ranges of variation and averages of measurements on the Spanish sheep.

Jakkalsberg B may have been rapid. The equid in Jakkalsberg B is likely to be the plains zebra.

Sheep size

The measurements given in Table 4a and 4b allow some insight into the size of sheep from Jakkalsberg. A shortcoming, as noted above, is the lack of suitable comparisons from southern African archaeological sites. In an attempt to achieve some impression of size, we compared the Jakkalsberg sheep with Spanish Bronze Age sheep from the site "Cerro de la Virgen", near Orce in the northeast of the Province of Granada (Von den Driesch 1972). Due to the high level of fragmentation of the Jakkalsberg material no complete limb bones were available for size comparison. However, the talus ("astralagus") does give an impression of size and shoulder height and this element was consequently selected for the purpose. Figure 4 shows the result of a comparison of the talus from the two Jakkalsberg sites with the Spanish material. The length of the lateral side reflects shoulder height, while the distal breadth of the talus gives some impression of robusticity. The comparison suggests that the Jakkalsberg sheep were both larger and more slender than the Bronze Age sheep from Spain. This would fit the expected pattern of longer-limbed sheep in more arid environments (Von den Driesch 1972; Zeuner 1962). This may point to a long period of local adaptation, which in turn could mean that at present we underestimate the time depth of the introduction of sheep into southern Africa.

Figure 5 gives a comparison of the distal humerus, which mainly reflects robusticity. The Jakkalsberg sheep seem somewhat more robust than the Spanish sheep, which supports the pattern for the talus.

Age profiles

Teeth from Jakkalsberg A were too fragmentary to allow accurate age profiles. However, postcranial evidence suggests that all age classes are represented from newborn to fully adult. With regard to the age profile based on teeth from Jakkalsberg B (Table 3), there is clear indication that there was no specific focus on a certain age class. Most importantly, the sample is not dominated by juvenile individuals as is the case with Kasteelberg (Klein & Cruz-Uribe 1989). There is also no evidence for old sheep.

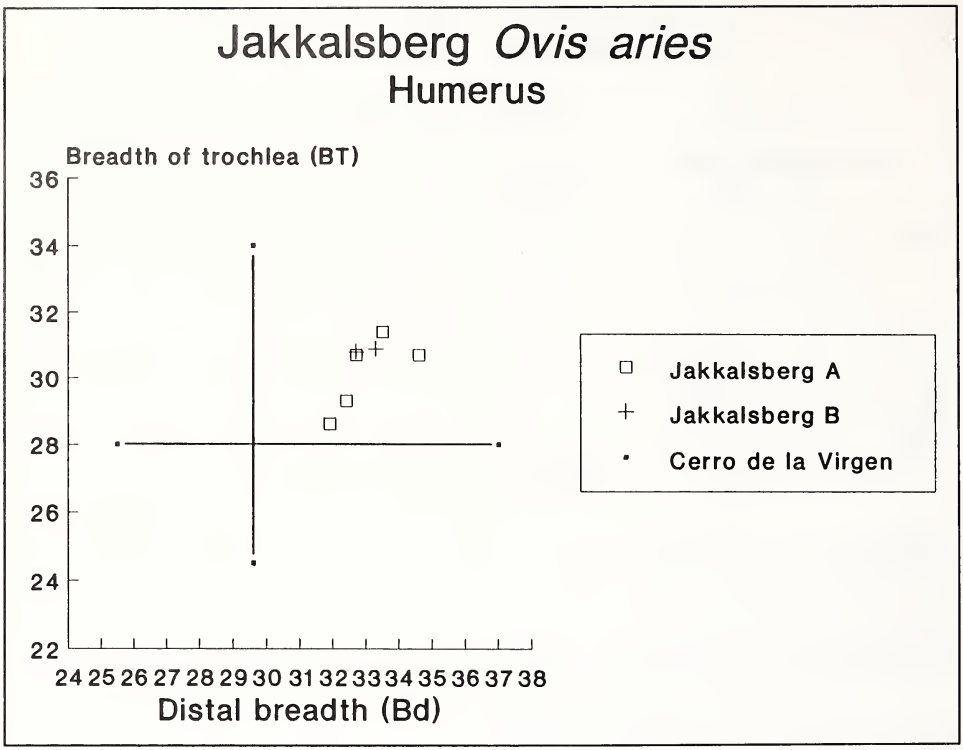

Fig. 5. A comparison of sheep distal humeri from Jakkalsberg A & B and the Spanish site "Cerro de la Virgen". The two axes of the cross represents the ranges of variation and averages of measurements on the Spanish sheep.

Sex ratio

The sex ratio for Jakkalsberg A based on pelves for sheep/goat is male:6 specimens and female:1 specimen.

Red ochre staining

Ochre staining at the A site was found occasionally, on some upper sheep/goat teeth and on a sheep/goat lumbar vertebra. It was also found on the skull of the juvenile human burial recovered from the edge of the A site. With regard to the B site, it appears that the ochre was stored or transported in ostrich eggshells and tortoise bowls as numerous pieces were recovered thickly coated in red ochre. One talus of a sheep/goat and numerous bone splinters were found stained with red ochre. Most significantly, the pelvis of a young adult male sheep/goat was also found covered in ochre.

DISCUSSION AND CONCLUSIONS

Jakkalsberg is remarkable in the narrowly focused range of species exploited by the inhabitants of the site. The dominance of sheep in the faunal sample suggests that Jakkalsberg represents a "herding economy" (Smith *et al.* 1991). The inhabitants of the site were not targeting a particular age group in their butchery decisions although adult remains are more common. The sheep mortality profile at Jakkalsberg contrasts with Klein & Cruz-Uribe's (1989) hypothesis that pastoralist sites should contain mainly young males and postprime females. The mortality profiles of caprine samples from the prehistoric pastoralist site of Kasteelberg B and pastoralist levels at Boomplaas Cave A (Von den Driesch & Deacon 1985) and Die Kelders (Schweitzer & Scott 1973) are dominated by individuals in the first 10% of potential lifespan. The majority of the sheep remains from the base of the Kasteelberg B site (Klein & Cruz-Uribe 1989) which date to the same period as Jakkalsberg (*i.e.*, 1300 BP), were less than 12 months of age.

It also is instructive to compare the faunal sample from Jakkalsberg with that collected by Robertshaw (1978:29) from a recently abandoned pastoralist camp-site beside the lower Orange River at Sendelingsdrift, i.e., only a few kilometres upriver of Jakkalsberg. Although we do not know the size of the pastoralist group who resided at Sendelingsdrift or the duration of their stay,

the modern goat sample, consisting of 23 individuals, were all between 24-30 months of age. This confirms the second author's observations among contemporary pastoralist groups (in many cases descended from the Namaqua Khoekhoen) in the Leliefontein, Steinkopf and Richtersveld Rural Areas, that young adult or adult sheep and goats are preferentially slaughtered in order to obtain maximum meat gain. The results from Jakkalsberg would support such a butchery strategy. When newborn sheep are represented, as in the Jakkalsberg B sample, they are more likely to reflect the high infant mortality rate (which may reach 30%) among contemporary pastoralist groups (Cribb 1984), rather than be indicative of a deliberate policy of slaughtering juvenile individuals.

The limited impression of sheep size offered by the highly fragmented bone remains suggests that the Jakkalsberg sheep were robust and long-limbed. This may reflect a long period of adaptation to the arid climate of the dry western parts of southern Africa, since sheep from more arid parts normally are long-limbed. This could point to a long period of local adaptation and an earlier date of introduction than commonly accepted at present. This, however, needs to be tested by further measurements on sheep remains.

The ochre-stained pelvis of a young adult male sheep/goat from Jakkalsberg B suggests that domestic stock may have been slaughtered for various ritual purposes. Among the Griqua (Waldman 1989) and the Korana (Engelbrecht 1936), who are both Khoekhoen pastoralists, female sheep or goats are slaughtered during a young girl's initiation ceremony, and the pelvis (liberally coated with ochre and fat) is hung up in the initiation hut. It was believed that the pelvis or //haus of the slaughtered animal, which contains certain magical powers (Hoff 1990), should not be broken or the initiated girl would suffer complications during childbirth. The presence of the ochre-stained pelvis at the B site supports the view, explored elsewhere (Webley in press), that it may have functioned as a gender-specific area.

Finally, with regard to the large fish sample from Jakkalsberg (as yet unidentified) only *Clarius gariepinus* or catfish could be positively identified. The historical sources have suggested that the consumption of fish may have been associated with various food taboos but the large fish sample from Jakkalsberg indicates that at least some of the occupants of the site, whether male, female or juvenile, were consuming fish some 1300 years ago.

Jakkalsberg is also unusual in other respects. There is clear evidence that its inhabitants had access to iron (Miller & Webley 1994), while differences in material culture between the A and B sites hint at gender relations which are further discussed elsewhere (Webley in press). We conclude by noting that the differences between the contemporary sites of Jakkalsberg and Kasteelberg point to variability among pastoralist peoples during the pre-colonial period. Further excavations of pastoralist sites (as well as sites containing ceramics and/or domestic caprine remains) in South Africa, are likely to change the perception that Khoekhoen history was 'timeless' or 'static' (Abrahams 1995).

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THE LATE HOLOCENE OCCUPANTS OF DIE KELDERS: HUNTER-GATHERERS OR HERDERS?*

M. L. WILSON

24 Junomar Court, Camp Street,
Tamboerskloof, Cape Town, 8001

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ABSTRACT

The question of whether the Late Holocene occupants of Die Kelders cave were hunter-gatherers or herders is investigated on the basis of comparison of artefacts and fauna from that site and those from sites identified by Smith *et al.* (1991) as having been occupied by one or other of these groups. The suggestion by Klein & Cruz-Uribe (in press), that the cave was occupied by herders, is also considered. It is concluded that the artefacts and fauna from Die Kelders do not meet Smith *et al.*'s criteria for either hunter-gatherer or herder occupation, nor do they support Klein & Cruz-Uribe's suggestion of herder occupation.

INTRODUCTION

On the basis of the analysis of a number of sites in the coastal region and two at its inland margin, Smith *et al.* (1991) concluded that it is possible to distinguish between those that are the result of the activities of hunter-gatherers and herders respectively. Briefly summarised, hunter-gatherer sites are said to contain relatively high frequencies of formally retouched stone artefacts (formal tools), few potsherds, relatively small ostrich eggshell beads and a predominantly wild fauna. Herder sites contain few formal tools, many potsherds, relatively large ostrich eggshell beads and a predominantly domestic fauna. It is thus appropriate to examine these aspects of the Die Kelders Late Holocene assemblage (DK1, ca. 1960-1465 BP; Schweitzer 1979, table 1) to see how they meet these criteria. Because analysis of the material from the 1992-3 excavations is not yet complete, data from the earlier excavations, which are generally similar to those from the later excavations, are used.

This paper concentrates on the Die Kelders evidence from layers 12 and 2, the former because it was the first occupation unit and the latter because it yielded the greatest number of remains of domestic sheep as well as a reconstructable pot that differs markedly from those in layer 12. In the comparisons with other sites, it should be understood that, according to Smith *et al.*, Kasteelberg A and B are herder sites, whereas Witklip, Driebos and Voëlvlei are hunter-gatherer sites. Except where stated otherwise, the data provided below are derived from the appropriate tables in Schweitzer (1979) and Smith *et al.* (1991).

STONE ARTEFACTS

Formal tools, consisting mostly of rather crude segments and small scrapers, account for only 0,9% of the DK1 site total, and utilized artefacts, mostly on cobbles and pebbles, for 10%. Quartzite (58% of the site total) is the most common raw material, followed by quartz (41%). Although quartz may be classified as a fine-grained material, its brittle nature causes it to fracture into mostly unusable pieces: 55% of the site total consists of chips and chunks. Despite this, the majority (58%) of the formal tools were made on quartz, followed by chalcedony (23%) and silcrete (16%), with only two (3%) on quartzite.

There is considerable variation in the frequency of the artefact categories in the various layers. Layer 12 yielded 46,4% of the site total of stone artefacts and 71% of the formal tools, layer 2 only 2,7% of the artefacts and none of the formal tools. Schweitzer's table 17 does not, however, indicate any discernible pattern of change from the bottom of the sequence to the top.

At Kasteelberg B (KBB) quartz is the most common raw material (51,5%), followed by quartzite (30,3%), but formal tools, said to be mostly on quartz and silcrete (Smith *et al.* 1991:87), account for only 0,2% of the site total. (The frequencies for Smith *et al.*'s sites have been adjusted to exclude ochre, which is not a material from which tools were made, although it is included in their tables of comparative tool type frequencies). Comparative data for Kasteelberg A (KBA) are not available.

At Witklip, a site about 10 km from the coast, quartz (63%) is the most common raw material, with silcrete

(29%) the next. However, formal tools, which account for 5,4% of the artefact total, are mostly (73%) silcrete, followed by quartz (26%). At both Voëlvlei and Driebos, the two painted shelters at the inland edge of the coastal plain, quartz is also the most common raw material, both overall and in formal tool manufacture. However, whereas at Voëlvlei formal tools, in both the pre-pottery and pottery levels, comprise 1,8% of the site total, at Driebos they account for 8,3% in the pre-pottery level but only 0,4% in the pottery level. The three 'hunter-gatherer' sites are thus more like the herder site of KBB in the frequency of the dominant raw material than any of the four is like DK1. Where formal tool frequencies are concerned, DK1 is intermediate between the higher figure for Voëlvlei and the lower figures for KBB and the pottery levels of Driebos.

POTTERY

Of the 1 118 sherds recovered from DK1, 84,6% came from layer 12 and 10,5% from layer 2. The forms of eight vessels from layer 12 could be wholly or partly reconstructed, but that of only one from layer 2. The reconstructed forms of the layer 12 vessels are markedly different from that of the layer 2 pot, but the sherds from the intervening layers are inadequate for determining whether the change was gradual or abrupt (Schweitzer 1978:155-170, figs 25-32).

Given that about 85 m^3 of deposit was excavated, the total is low when compared with the more than 30 000 sherds recovered from the 71 m^3 excavated at the KBA and KBB sites (Sadr & Smith 1991). Average sherd density per cubic metre for DK1 is 305 in layer 12 and 23 in layer 2. For KBB it is 700-800, for Witklip 11, for Voëlvlei 254 and for Driebos 354. DK1 Layer 12 is thus intermediate between the last two sites and layer 2 closer to Witklip than to any of the others.

In a later paper, Yates and Smith (1993:97, table 1) used a different method of calculating sherd density, in which the total number of sherds is divided by the total number of pieces of flaked stone. On this basis, DK1's densities of 0,3 for layer 12 and 0,7 for layer 2 fit better into the post-pottery hunter's site range of 0,02-0,5 than into the 1,1-1,6 range for "post-pottery herders" (*sic*) sites.

Although analysis of the material from the 1992-3 excavation is not yet complete, it appears that this will yield considerably fewer potsherds than came from Schweitzer's excavation, particularly in the case of layer 12 (pers. obser.).

OSTRICH-EGGSHELL BEADS

The diameters of the unbroken beads from DK1 layer 2, as well as three samples from layer 12, were measured for comparison with those from the sites mentioned above. The layer 12 beads are stored in separate containers according to their provenance in the squares and subunits within the layer and the samples were chosen at random, subject only to the container appearing to contain a sufficient number for measuring. The mean diameter of each sample was tested (Student's *t*) against that of all the other DK1 samples as well as those of the similarly-dated samples studied by Smith *et al.*, whose comparisons did not include Voëlvlei or Driebos.

The mean diameters of two of the layer 12 samples (nos 1252 and 1444) are not statistically significantly different from each other, whereas those of the other paired samples (1252 & 1281 and 1444 & 1281) are very highly significantly different from each other ($p = < 0.001$). The pooled layer 12 sample mean diameter is also very highly significantly different from that of the layer 2 sample. An indication of the nature of the difference between the layer 12 and layer 2 samples is that none of the layer 12 bead diameters exceeds 6,0 mm, whereas in the layer 2 sample 22% of the diameters are between 6,1 mm and 8,6 mm.

The layer 12 sample is very highly significantly different from that of the KBA 1800 BP sample, as is the layer 2 sample from the KBB 1300 BP sample. The layer 12 sample is not significantly different from the Witklip Unit 3 sample (1800-1400 BP), whereas the layer 2 sample is very highly significantly different.

At DK1 and Witklip, bead size increased through time, but at the Kasteelberg sites it decreased, although in the case of KBA this is not statistically significant. The DK1 beads are closer in range and mean to those from Witklip than they are to those from KBA and KBB.

Yates & Smith (1993:98) mentioned that sieves with a 3-mm mesh had generally been used in the excavations for which Smith *et al.* (1991) provided data, but that at Witklip the use of a sieve with a 1,5-mm mesh had retained "many small beads", whereas a test on the spoil-heap from KBB had not. The beads from the smaller-mesh sieve were not included in Smith *et al.*'s comparisons (fig. 6, table 2), but Yates & Smith considered that if they had been the distinction between the beads from that site and the Kasteelberg sites would have been even more marked. They also commented that "the very small beads we recognize as common from most hunter deposits are insignificant in all presently known herder inventories".

If the suggestion that herders preferred larger ostrich-eggshell beads than those worn by hunter-gatherers (Jacobson 1987, Smith *et al.* 1991, Smith & Jacobson 1995; but see Wilson 1993:334-5, Kinahan 1995) is accepted as valid, then it might be supposed that the layer 2 occupants of Die Kelders were - culturally, rather than biologically - 'hybrids': people in transition from being hunter-gatherers to becoming herders. However, given that the bulk of the layer 2 beads have diameters less than 6 mm and that the sample mean is significantly different from that of both the KBB herder sample and the Witklip hunter sample, the answer is far from clear.

DOMESTIC STOCK

Schweitzer (1979, table 27) reported on the recovery of the remains of a minimum of 30 sheep *Ovis aries*, plus

four doubtfully identified individuals. Of these, 18 came from layer 2 and 7 from layer 1, but none from layer 12. (G. Avery 1996, pers. comm.) has advised that the 1992-3 excavations yielded at least one from the upper part of layer 12.) The remains of only two doubtfully-identified cattle *Bos taurus* were recovered from layer 2 of Schweitzer's excavation. Klein & Cruz-Uribe (in press) report that wild bovids are more common than domestic ones in the fauna from the 1992-3 excavations, as was the case in Schweitzer's excavation, although in his layer 2 they are only marginally so (25:20). The situation is reversed at Kasteelberg (Klein & Cruz-Uribe 1989), with more sheep and cattle than wild bovids at both KBA (35 sheep, 2 cattle and 5 wild bovids) and KBB (54 sheep, 4 cattle and 36 wild bovids). Domestic animals were not recorded from Witklip, Voëlvlei or Driebos, but Smith *et al.* considered it possible that some (sheep) might be in the unidentified small-medium bovid class.

Klein & Cruz-Uribe (in press) consider that a composite mortality profile for the sheep from the earlier DK1 excavations, based on both age and sex determinations (Schweitzer 1974, 1979) shows that the sample comprises mainly very young males and old females, and that this "is consistent with flock management and suggests that the LSA occupants were herders rather than rustlers".

In Schweitzer's (1974) study, 7 were aged 6 months or less, 11 were 12 or 18 months and 4 were between 2 and 4 years. Schweitzer also reported that sex determinations could be made for only six individuals, all of which were male. Later, Schweitzer (1979:203) commented that it had been found that over 60% of the Namaqua Afrikaner ewes, at an experimental station where they were trying to back-breed Khoikhoi fat-tailed sheep, have horns. He therefore considered the validity of the argument for systematic herding, based on the frequency of horn-cores and the consequent suggestion of a dominance of young males and older females, to be "somewhat weakened". Klein & Cruz-Uribe (1989) provided a diagram of sheep mortality profiles that includes those from DK1. The total lifespan is given as 144 months and 25 of the DK1 sheep are put into the first 10% of lifespan, 3 in the second 10%, and only one each in the fourth and fifth 10%. This does not support the claim that the sample comprises mainly young and "old individuals", of whatever sex.

However, even if the argument for a dominance of young males and old females could be supported, another interpretation can be made. As was suggested elsewhere (Wilson 1993:347), young males and post-prime females being unnecessary for flock management, these are the parts of the flock most suitable for barter, or payment for various services (Smith 1990:10-11). Kolb (1738:171) said that the Khoikhoi did not separate the rams from the ewes, which consequently often lambed twice a year. This would account for a high frequency of lambs relative to more mature animals and, as they were smaller, they would have been less costly to their owners in the bartering process than would adult animals.

The virtual absence of sheep from the layers below layer 2 (4 plus 4 doubtfully identified) is not persuasive of a claim that the Holocene deposits are the result of the activities of herders. Even in the case of layer 2, if the two dates accepted by Schweitzer (1978, table 1) have any relevance (see Sealy & Yates 1994: 62; table 2), they show that this unit may have accumulated over a period of as much as 100 years, so that the presence of the remains of 18 sheep yields an average of about one every five years. That the majority of the sheep are juveniles suggests that their presence in layer 2 was not the result of a single episode, such as the theft of a small flock, since the sample would then have included a greater number of adults than is the case.

DISCUSSION AND CONCLUSION

DK1 is the only site of those discussed where quartzite is the most common raw material. It has low frequencies of formal tools, mostly on quartz, that are comparable to those from KBB, Voëlvlei and the pottery levels of Driebos. The average density of potsherds per cubic metre is closer to that of the 'hunter-gatherer' sites than to that of the herder sites. The ostrich-eggshell bead diameters are significantly different from those from the contemporary levels of KBA and KBB and closer in range and mean to those from Witklip. Wild bovids are more common at DK1 than are domestic ones, whereas the opposite is the case at KBA and KBB; and domestic animals were not identified in the fauna from the three 'hunter-gatherer' sites.

The foregoing indicates that DK1 has in common with the herder sites a low incidence of formal tools and the presence of sheep and potsherds, albeit relatively few. Where the frequency of potsherds and the size of ostrich eggshell beads are concerned, DK1 has more in common with the 'hunter-gatherer' sites than with the herder sites. Thus, in terms of Smith *et al.*'s (1991) criteria, DK1 cannot be classified as either a herder or hunter-gatherer site, although it must be pointed out that there is no great consistency in the components of the three sites they identified as hunter-gatherer.

Schrire (1992) studied the data used by Smith *et al.* (1991) to distinguish between herder and hunter sites and concluded that, because of the degree of overlap in the data from their two types of site, their evidence was "too inconsistent to confirm or deny the existence of two groups" and she asked why this should signify cultural rather than behavioural distinctions. She also suggested that if pastoralism had been adopted by local hunters they might have retained some of their practices when hunting and adopted new ones when more fully engaged in herding.

In their reply to Schrire's critique, Yates & Smith (1993, table 1) provided data that show that the hunter sites in Smith *et al.*'s (1991) study generally have consistently higher frequencies of formal tools than the herder sites and that the incidence of silcrete is generally higher at the former than at the latter. They also show that the frequency of potsherds, when calculated on the

basis of their 'pottery index', is consistently higher at their herder sites than at the hunter sites, though this is not always the case when comparison is based on the number of sherds per cubic metre.

In the present writer's view, however, the low frequencies of sheep and potsherds, together with the evidence that most of the sheep were lambs, suggest that the LSA occupants of DK1 were hunter-gatherers who, whether licitly or not, obtained domestic stock from herders, rather than that they were herders, as suggested by Klein & Cruz-Uribe. While it mat be suggested that variations in raw material frequencies may be as much a matter of local availability as of suitability (or preference) for the task in hand, the reason(s) for variation in the frequency of formal tools - both within sites as well as between them - is a matter that is still far from being resolved. The use of the size of ostrich-eggshell beads as a means of distinguishing between hunter-gatherer and herder sites, rather than merely as an indicator of cultural change, also needs further investigation particularly from other indisputably-identified herder sites before the validity of this suggestion can be accepted.

Two other aspects need to be considered in the debate on the identity of the occupants of archaeological sites. The first is what kind of housing the earliest pastoralists in southern Africa had. If, as seems to have been the case, they had only sheep these animals would not have been able to transport the mat-and-wattle huts that were so typical of the Khoikhoi in the early period of recorded history (*e.g.*, Raven-Hart 1967 *passim*; Kolb 1738:220-222, table 1, figure 1; Smith & Pheiffer 1993, plate 4). This would seem to allow for the suggestion that the early herders may have used caves, but this need not necessarily have been the case, as they could have made shelters from leafy branches or even mats, such as those used by modern San.

Caves in general are not suitable for even the temporary herding of small stock, particularly if some of these are to be slaughtered during the occupation. Die Kelders cave is difficult of access, from either east or west, for relatively long-legged, bipedal humans, let alone sheep, however agile they may have been. In fact, the site's relative inaccessibility, while it would have provided safety, may have been the cause of its relatively short Holocene occupation, although it is also possible that the problem of access developed subsequent to its last occupation.

The second aspect that needs to be considered is whether pottery preceded herding in South Africa, as is indicated by Kinhahan's (1991) research in Namibia. As mentioned above, Die Kelders layer 12 yielded the greatest number of potsherds, and reconstructable vessel forms, but no remains of sheep, whereas the later excavation has yielded sheep remains but comparatively few potsherds. G. Avery (1996 pers. comm.) has advised that a radiocarbon date recently received for charcoal from layer 12 of the 1992-3 excavations is substantially the same as the date for Schweitzer's excavation and it remains to be seen whether a new series of dates will support the original dates or the somewhat later accelerator dates on sheep remains published by Sealy & Yates (1994). Avery has also mentioned that, if possible, dates will be obtained directly from sheep remains from the later excavations, which will help clarify the situation regarding the disparity between Schweitzer's date for layer 7/9 (GX-1687: 1960 $\pm$ 95 BP) and those obtained by Sealy & Yates (1994) from the sheep bone from layer 7 (OxA-3860: 1325 $\pm$ 60 BP and OxA-3861: 1290 $\pm$ 60 BP). The chronology of the introduction of pastoralism is clearly important for the evaluation of changes in the artefactual and faunal content of sites and the interpretation of the effect this had on the local inhabitants.

A subsidiary aspect is whether the change in the pottery styles, from those of layer 12 to that of layer 2, can be interpreted as evidence of a transition from the activities of hunter-gatherers who made pots to those of pastoralists who were initially herders of only sheep but, later, of cattle as well as sheep. Unfortunately, the information from the Kasteelberg sites (Sadr & Smith 1991), despite the large quantity of sherds recovered, provides no assistance in this regard, particularly as evidence of change is restricted to attributes of vessels, not to whole vessels, or even reconstructable forms (see also Wilson 1993:325-6).

The conclusion to be drawn from this study is that the evidence presently available is insufficient for it to be determined with any certainty whether Late Holocene sites were occupied by hunter-gatherers or herders, this being particularly true in the case of Die Kelders. Three possible scenarios need to be tested: that pottery was introduced by pre-pastoralist hunter-gatherers; that sites, whether in caves or in the open, that contain potsherds and the remains of domestic stock are the result of the activities of hunter-gatherers with access to commodities owned by herders; and whether the early herders, who apparently had only sheep and thus no animals suitable for transporting their huts and other impedimenta, lived in caves or rock-shelters as well as in the open. It is considered especially important that more sites be found that can be unequivocally attributed to the activities of herders: those who may have had only sheep as well as those with both sheep and cattle.

ACKNOWLEDGEMENTS

Thanks are due to Graham Avery for permission to use as yet unpublished information from the 1992-3 excavations at Die Kelders and to the two anonymous referees for their comments on the previous version of this paper. With regard to the recommendation of one of these, that my data for ostrich eggshell beads should be tabulated, I regret that when I retired from the South African Museum this information, on disk as well as on paper, was destroyed.

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TWYFELPOORT SHELTER: A LATER STONE AGE SEQUENCE*

LUCINDA BACKWELL, KAMAL BHAGWANDAS-JOGIBHAI, GERALDINE FENN, CHRIS JAMES, GHILRAEN LAUE, JENNIFER MATIER & CAROL WALLACE

Department of Archaeology, University of the Witwatersrand, Private Bag 3, WITS 2050, Johannesburg

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ABSTRACT

Twyfelpoort is a Later Stone Age site in the eastern Free State, situated in a region where Basarwa (San) and both Bantu-speaking and European farmers interacted during the early nineteenth century. The artefact assemblages from the upper levels show evidence of interaction between the three groups. In these and the lower levels the stone tool assemblage is post-Classic Wilton. Change resulting from social and economic stress may be detected at this site. The analysis of charcoal provides evidence of climatic change over the last 2000 years. A cool period indicated at about 150 BP coincides with the end of the "Little Ice Age".

INTRODUCTION

Twyfelpoort is a south-east facing shelter east of Marquard (28.37S; 27.34E) in the Hibernia district of the eastern Free State (Fig. 1). It is 20 m long and 8 m wide, and is situated on the southern slope of a hillside overlooking a small river valley. This hillside and valley are micro-features on a large plateau. The grassveld in the region has been classified as *Cymbopogon-Themeda* mixed sour veld (Acocks 1975) and the shelter is surrounded by dense copses of *Celtis africana, Pittosporum viridiflorum, Clutia* sp., *Rhus* spp., *Euclea crispa* and *Buddleia salvifolia*. Some 5 km from the site is the escarpment of the plateau and in the valley below the escarpment *Acacia* spp. and *Olea africana* are common.

The shelter contains several faded rock paintings, including many eland and a group of clapping women seated near a shaman who is bleeding from the nose. At present it is impossible to associate the paintings with any particular phase of occupation. A hiking trail used to go through the shelter, causing considerable trampling of the deposit and some damage to the paintings. The hiking trail has now been diverted to protect the site.

The excavated deposit from Twyfelpoort comprises a Later Stone Age (LSA) sequence dating to the late Holocene. The upper four levels, the P, D, H and C levels, all contain artefacts or items which indicate interaction with either black or white agriculturalists. A hiatus of about 1700 years separates these interaction levels from the pre-ceramic L level, which has been radiocarbon dated to 1880 ± 50 BP (Pta-6171) (Wadley 1995).

Being one of only nine dated LSA sites in the eastern Free State (Wadley 1995), Twyfelpoort has the potential to add greatly to our knowledge of the archaeology of this area. In addition, it is an interaction period site and can provide valuable information about types of interaction between Basarwa (San) and farmers, as well as the effects that interaction had on the traditional hunter-gatherer way of life.

HISTORICAL BACKGROUND TO THE SITE

The evidence for interaction at Twyfelpoort is in the form of peach pips, glass, pottery and metal and, by examining the history of the area we hope to determine the kind of interaction that was operating, and the options it presented to the hunter-gatherers.

A movement of Bantu-speaking agriculturalists southward into the eastern Free State occurred between the sixteenth and eighteenth centuries (Klatzow 1994:9). By the time the white trekboers arrived in the area in the 1830s, the Basotho, under the leadership of Moshesh, were in control of much of the land (Wallace 1994:4).

Bantu-speakers and white trekboers would have had the most opportunities for interaction with the hunter-gatherers, though the possibility of contact with the Griquas to the east and the Korana to the west (Wallace 1994:6) should not be ignored.

Faced with an influx of culturally different groups into the area, the hunter-gatherers of Twyfelpoort may have responded in a number of ways. One option open to them was to retreat into areas unsuitable for animal herding and agriculture, a strategy employed by the Basarwa of the western Cape when the arrival of pastoralists

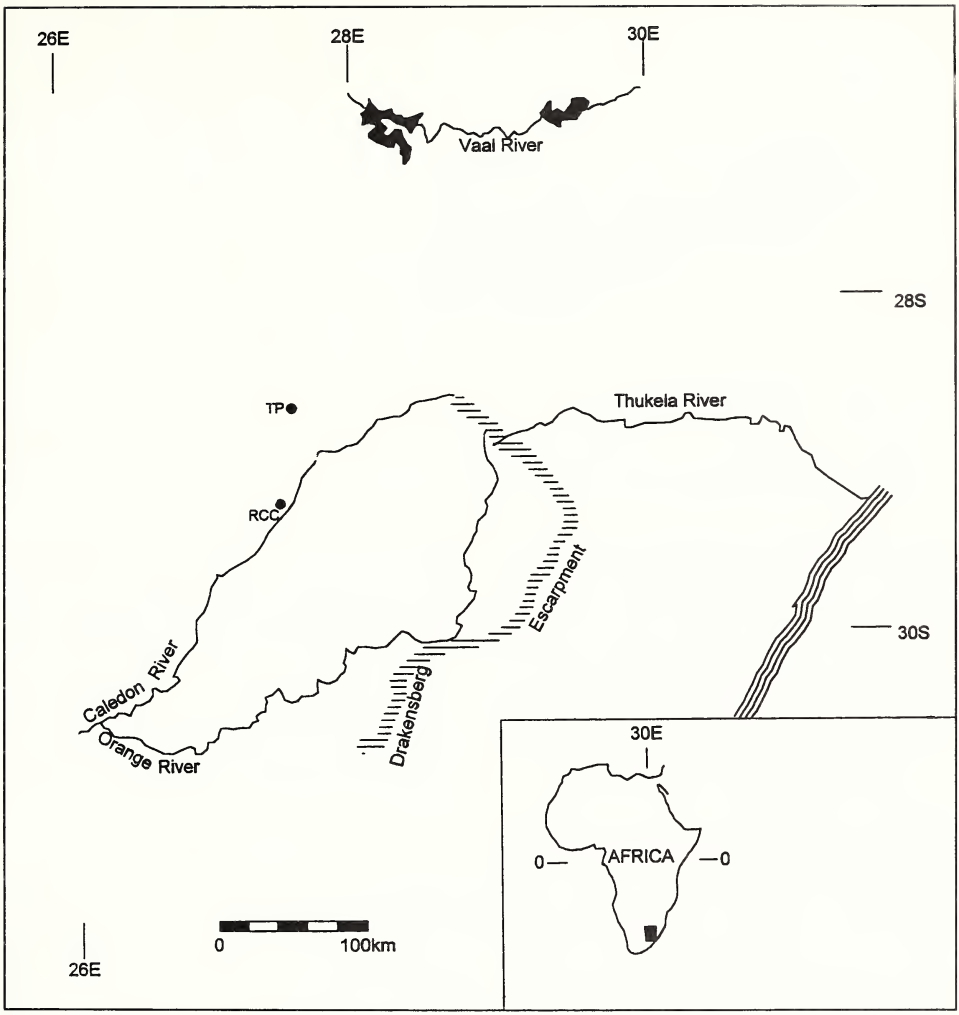

Fig. 1. Location of Twyfelpoort Shelter (TP) and Rose Cottage Cave (RCC).

threatened their access to resources (Penn 1986:64). A second option available was aggressive confrontation with the settlers and raiding of their livestock (Wallace 1994:36). The third strategy open to hunter-gatherers was to enter into a symbiotic relationship with their agriculturalist neighbours. This may have taken several forms: hunter-gatherers working as herdsmen or rainmakers for the farmers in exchange for domestic carbohydrates; trade of items such as animal pelts for carbohydrates or objects like beads and metal implements; or trade of subsistence goods such as hunted meat for carbohydrates or other goods (Klatzow 1994:10).

If this strategy was adopted, as it seems to have been by the hunter-gatherers of Jubilee Shelter in the Magaliesberg (Wadley 1996), one might expect a more complex form of social interaction, such as intermarriage, to have developed. If adopted, this kind of social interaction might in turn have been the catalyst for the social disintegration of the hunter-gatherers in the area. In addition, the increased political control gained by some shamans, through the performance of rain-making rituals for the black farmers, resulted in an imbalance of power in a traditionally egalitarian society (Dowson 1994), which must have aided the dissolution process.

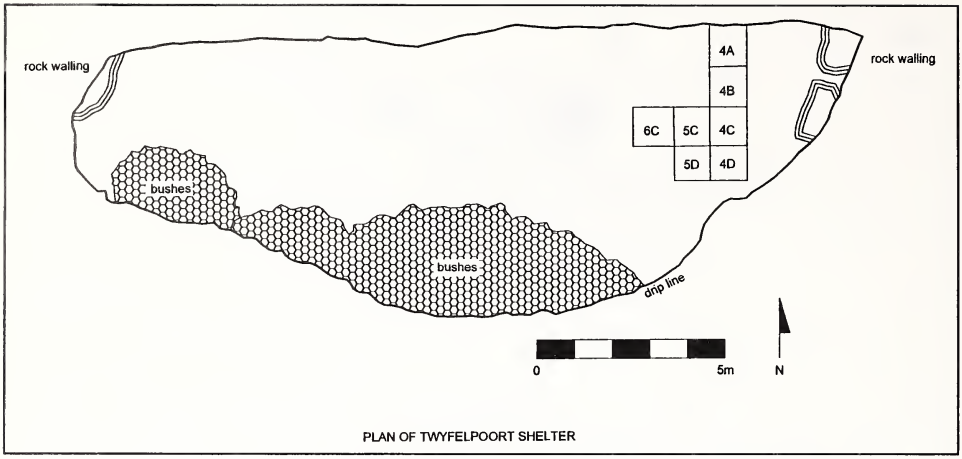

Fig. 2. Plan of Twyfelpoort Shelter showing the position of the excavation.

Consequently, occupation sites may have been abandoned by the Basarwa and claimed by black farming communities, as in the case of Rose Cottage Cave (Wadley 1992:8).

The history of the eastern Free State is complex, involving a subtle interplay of many social, political and economic factors that are only tentatively suggested by the archaeological record. This should be kept in mind when studying the results of the Twyfelpoort excavation.

EXCAVATION AND STRATIGRAPHY

Two phases of excavation have taken place at Twyfelpoort. During Wallace's 1993 excavation, six one metre by one metre squares were excavated (Fig. 2). Our 1996 excavations took the LSA sequence down further, and a new square, 6C, was opened up adjacent to 5C (Fig. 2).

The stratigraphy of the site is complex (Fig. 3). The D level, a yellow-brown deposit, is an intrusive layer within the L and H levels. This may be the result of a hill wash. The P level is an orange-brown layer which overlies the M and H levels in squares 4A and 4B. Peach pips were present in this layer (Wallace 1994), but it yielded very low numbers of stone tools. This might be an indication either of an ephemeral occupation or the dissolution of the hunter-gatherer group living at Twyfelpoort. The H level, also a post-contact level, is disturbed in squares 4B and 4C by a large rock and cut off by another rock in square 4A.

The M level is an orange-red deposit which underlies the P and has H as an intrusive element. Level L, a brown-black level underlying the H is dated 1880 ± 50 BP (Pta-6171). Since the H contains evidence for interaction, particularly in the form of peach pips, it probably dates to around AD 1836 (Wallace 1994). It thus seems that there is a hiatus in occupation of about 1700 years between the L and the H levels. Underlying the L is the dark brown B level. The deposit surrounding the hearths in B was almost black in colour due to large amounts of charcoal. Beside the B is the G level, chestnut to reddish brown in colour, which appears to be truncated by the saucer-shaped B. Two hearths (Hearths A and B) continued from level L down through the B and into the G level. Level B is dated 3210 ± 50 BP (Pta-7245) from charcoal in square D4, and hearth B in level B is dated 3020 ± 60 BP (Pta-7254) from charcoal in square C5.

STONE TOOLS

The Twyfelpoort formal lithic assemblage is dominated by small scrapers, which form 54% of the total. Medium scrapers form 10.3% of the total, backed blades make up 6.6% of the total and spokeshaves and adzes are also conspicuous in the assemblage, comprising 11% of the total (Table 1 & Fig. 4).

Small scrapers increase through time in the pre-ceramic levels, but decrease in the ceramic C level. In the H there is a resurgence of scraper frequencies, before they almost cease to be manufactured during the P. This same trend is followed by the blades, spokeshaves and adzes, as well as by the tools exhibiting miscellaneous retouch. In the other formal tool categories frequencies are too small to be able to discern any definite trends through time.

The stone tools from Twyfelpoort can be classified as post-Classic Wilton, an industry characterised by a predominance of scrapers and backed blades. The assemblage is comparable to those from other LSA sites in the area, such as Rose Cottage Cave (Wadley 1991:127) and Roosfontein Shelter (Klatzow 1994:12).

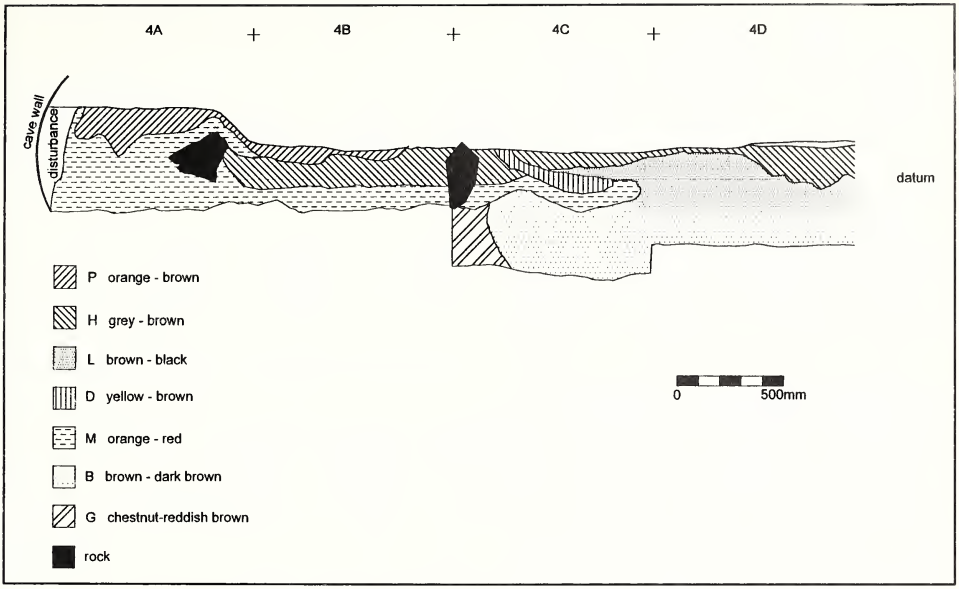

Fig. 3. Twyfelpoort: east section of squares 4A, 4B, 4C and 4D.

Table 1. Twyfelpoort Shelter: inventory of formal tools

Level	S	P	D	H	C	L	Ch in L	M	B	G	DP	Total	%
Scrapers													
Large		1				2			2			5	1.2
Medium		8		9	7	7		8	3			42	10.3
Small		2		55	12	91	1	42	14	2	2	221	54.1
Backed Tools													
Segments						1				2		3	0.7
Blades		1		12		13				1		27	6.6
Miscellaneous		1		2		2						5	1.2
Broken											1	1	0.2
Other Tools													
Spoke/Adzes		6		11	6	12		4	4	2		45	11
Awl/Borers				3	1	4						8	1.9
Broken Tools				2		2				1		5	1.2
Miscellaneous				15	1	16		1				33	8.1
MSA Tools		4			1							5	1.2
MSA Recycled				1	1	2				1		4	0.9
Ground Stones				2	1	2						5	1.2
Total	**0**	**23**	**0**	**112**	**30**	**154**	**1**	**55**	**23**	**9**	**3**	**410**	**100**

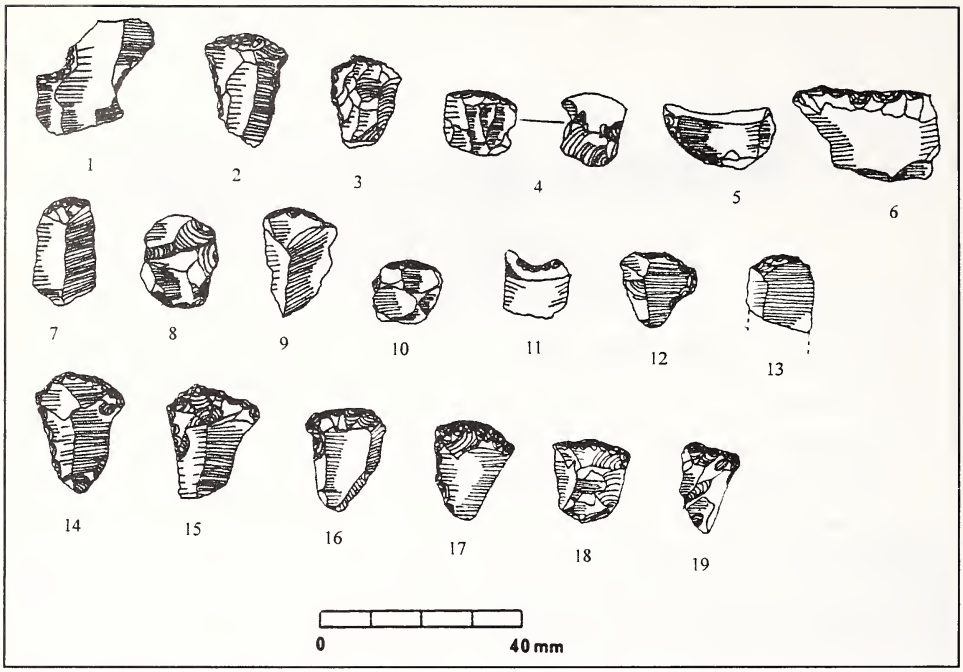

Fig. 4. Selected retouched stone tools from Twyfelpoort Shelter. 1: spokeshave (Square 4A, Level P); 2-5: scrapers (Square 4A, level P); 6: knife (Square 4A, Level P); 7-10: scrapers (Square C6, Level H); 11: spokeshave (Square C6, Level S); 12-19: scrapers (Square A4, Level M).

Table 2: Twyfelpoort Shelter: Inventory of chips, chunks, cores, blades, bladelets, flakes and colouring materials.

Level	S	P	D	H	C	L	Ch in L	M	B	G	DP	Total	%
Chunks	25	138	17	1055	207	212	39	141	417	85	39	2375	22.1
Chips	29	179	76	1683	304	1758	36	156	478	67	14	4780	44.4
Cores		16		40	22	54	3	5	17	4	2	163	1.5
Blades		1		31	5	32			6	1		76	0.7
Bladelets	1	14	5	55	22	53	5	6	19	2	5	187	1.7
Broken Blades	1	12	2	84	21	82	6	8	20	4	8	248	2.3
Flakes													
Core													
Rejuvenations				3		1			1	1		6	0.1
Cortical		2	9	49	1	36	2	12	8	1	1	121	1.1
Endstruck	2	160	16	351	112	396	17	51	160	34	21	1320	12.3
Sidestruck		19		189	75	154	9	48	81	23	11	618	5.7
Broken Flakes	7	27	17	171	67	321	18	9	152	21	5	815	7.5
Haematite		1		7								8	0.1
Ochre		1	1	5	7	6		13				33	0.3
Quartz					1				2		17	20	0.2
Total	**65**	**570**	**143**	**3725**	**844**	**3105**	**135**	**449**	**1361**	**243**	**123**	**10770**	**100**
Buckets	0.5	28	4	53.5	10	89	12	50	56.5	25	6	816	

Table 3. Twyfelpoort Shelter: rock types used in post classic Wilton with ceramics (1996 excavation).

	Sandstone	Tuffaceous	Opaline	Other	Total
Chips	9	7	48	206	270
Chunks	60	2	62	209	333
Flakes	22	8	105	208	343
Blades/lets	1		10	16	27
Cores	1		10	4	15
Scrapers		1	14	1	16
Other Retouch				6	6
Ground Stone					0
Total	**93**	**18**	**249**	**650**	**1010**

Table 4: Twyfelpoort Shelter: rock types used in post classic Wilton without ceramics (1996 excavation).

	Sandstone	Tuffaceous	Opaline	Other	Total
Chips	224	168	494	208	1094
Chunks	358	70	301	180	909
Flakes	273	87	538	177	1075
Blades/lets	7	14	86	6	113
Cores	4	2	28	4	38
Scrapers	1	1	38	1	41
Other Retouch	1	3	15		19
Ground Stone					0
Total	**868**	**345**	**1500**	**576**	**3289**

Table 5. Twyfelpoort Shelter: Inventory of Worked Bone, Ostrich Eggshell, Shell, Metal and Pottery.

Level	S	P	H	M	L	B	G
Worked bone fragments			11	1	38	16	8
Bone beads					6		
Bone points					4		1
Ostrich eggshell beads			2		12	2	
Ostrich eggshell fragments			58	2	175	98	83
Shell ornaments			1		1		
Metal fragments & items	14		16	2			
Potsherds	2	16	27	1	2		

Middle Stone Age (MSA) tools from the P level and one

There are five tools in the assemblage not belonging to the post-Classic Wilton industrythese are four curated recycled MSA tool from the C. These, together with a quartz crystal, have been interpreted by Wallace (1994) as shaman's paraphernalia. A further two quartz crystals were recovered from the B and 17 from the small area called DP (in G) (Table 2). These may support Wallace's interpretation, but they might merely have been unused raw material for stone tool manufacture.

The two segments found in the G level may indicate the start of an earlier Wilton industry at the site. If the G does in fact signal the start of the Wilton, future excavations at the site may reveal a substantial LSA sequence.

In terms of flaking debris, the most notable element is the relatively high proportion of sidestruck flakes compared to endstruck flakes (Table 2). This is probably due to the frequent use of coarse-grained rocks such as sandstone and tuffaceous material (Wadley, pers. comm.).

The differences in raw materials used between the pre-ceramic and ceramic levels are quite striking (Tables 3 & 4). In the pre-ceramic levels opaline is very much the preferred rock type. Nodules of opaline might have been available from the river flowing near the shelter, or they may have come from further afield. No opaline is present in the river bed today. The use of opaline drops dramatically in the ceramic levels, where a variety of other materials is preferentially utilised. If the opaline nodules were brought to the site from, for example, the Caledon River, it seems likely that their decline in use for stone tool manufacture during the interaction period was a result of limited mobility and access to resources. However, it is important to note that 14 out of the 16 scrapers from the ceramic levels are manufactured from opaline (Table 3).

Only five grindstones were found at the site two in H, two in L and one in C (Table 1). Although no residue analysis has been done on the stones, no ochre was present on them, and it is likely that they were used for the processing of plant material. During the interaction period this processing might have included domesticated plant foods such as maize, obtained from farmers in exchange for goods or labour.

WORKED BONE

Worked bone is most abundant in the L level, but substantial amounts of worked bone fragments also occur in the H, M, B and G levels (Table 5). Five bone beads were found in the L level, and there were five bone points in total (Fig. 5). Contour/spatial pattern diagrams indicate that there is a concentration of bone fragments in squares 5C and 5D through the H, L, B and G levels.

OSTRICH EGGSHELL

As in the case of the worked bone, the ostrich eggshell fragments are most abundant in the L level, with substantial quantities in the H, B and G levels (Table 5). Two pieces were found in the M level. A total of 16 beads was found, once again with a concentration in the L level. The ostrich eggshell fragments show a close

approximation in distribution to the spatial patterning of bone fragments (*i.e.* a concentration in squares 5C and 5D) for the respective levels. Moreover, the bone distribution per level correlates approximately to ostrich eggshell distribution per level.

METAL

There was a total of 18 pieces of metal found in the excavation (Table 5). The metal fragments were very problematic, because of their high fragmentation and poor preservation, which made them undiagnostic. Amongst the pieces of metal are a nut and bolt as well as several rusted nails, probably left behind from the first excavation.

SHELL

There is a single fresh water mussel shell from the H level, as well as one broken mussel shell pendant (Table 5 & Fig. 5) from the L level.

POTTERY

There are several pieces of pottery present (Table 5), including one decorated rim fragment from the P level in square 6C (Fig. 5). The sherds found in the L level are probably intrusive. According to Maggs (1976), the rim fragment comes from a Type V industry. The distribution of this type of pottery includes the highveld between the Drakensberg escarpment, including the areas of Bethal to the north and Ladybrand to the south. This industry is dated, through historical evidence and radiocarbon dating, to between the sixteenth and nineteenth centuries. The pottery is characterized by rim notches or other rim impressions (Maggs 1976).

PEACH PIPS

Peach pips, an indicator of interaction with white farmers (Wallace 1994:23), are most abundant in the H level (2,8 kg) and the more recent level P contains only 600 g. Small amounts of peach pip occur in the pre-ceramic levels, though this can be attributed either to extensive trampling of the deposit or to intrusion. It is also possible that some peach pips fell into the pre-ceramic levels during excavation or filling of the trench after the first excavation.

CHARCOAL

Large pieces of charcoal were retrieved directly from the deposit and smaller pieces were recovered by dry sieving the deposit. Charcoal from six levels - H, P, M, L, B and G - was analysed by Laue. Sample sizes ranged from 112 to 193 pieces from each level. The charcoal was sectioned, mounted on slides, and examined under a dark-field incident light microscope at magnifications of between 50-200 X. This method provided sufficient detail of the wood structure to allow for rapid identification of

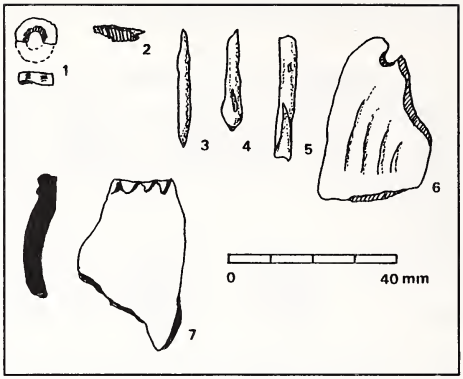

Fig. 5. Twyfelpoort Shelter: selected worked bone, shell and pottery. 1: bone bead; 3: bone point; 2,4,5: worked bone fragments; 6: shell pendant; 7: Type V potsherd.

the woody species.

Rhus spp. and *Olea africana* occur in high percentages throughout the sequence (Table 6 & Fig. 6). This is probably because they are good burners and are therefore preferred firewood. The high resin content of *Rhus* allows it to burn for a long time at a high temperature (Archer 1990). *Olea* is a dense wood and therefore it also burns well (Esterhuysen, pers. comm.).

Charcoals from P and H display a great diversity with a high percentage of scrub forest elements. In H and M the percentages of *Olea africana* are lower than in the other levels and *Leucosidea sericea, Cliffortia* sp., *Rhamnus prinoides, Passerina montana* and *Erica* spp. are present either for the first time or in increased frequencies. These additions are cool indicator species and a cooler climate than present probably existed during the H and M time periods. *Leucosidea* is a very good burner and ethnographic studies in Namaqualand (Archer 1990) and in Lesotho (Guillarmod 1971) show that if *Leucosidea* were present in the area it would have been used. *Leucosidea* is found in large quantities at other Free State sites, so if the species had existed in the area around Twyfelpoort in earlier periods, it would have been represented (Esterhuysen 1996). *Erica* is found throughout the sequence but it occurs in higher proportions in the H and M levels. Although it is an indicator of cooler conditions, *Erica* also grows in exposed areas, such as the sandstone expanses above the shelter (Esterhuysen, personal communication).

The cooler climate indicated by the species found in the H and M levels, coincides with the final phase of the "Little Ice Age" which lasted between AD 1300 to AD 1850 (Tyson & Lindesay 1992). The Tyson and Lindesay research has identified a warm interval in the "Little Ice Age", between about AD 600 and AD 250, and it is during this time that level L was occupied. A high percentage of *Olea africana* was present during level L.

Table 6. Twyfelpoort: Frequencies and percentage frequencies of identified woody taxa from charcoal analysis

Level	P	H	M	L	B	G
Myrica sp.	4 (3,5)	18 (9,4)	5 (4,3)	1 (0,9)		4 (2,8)
Celtis africana	5 (4,5)	5 (2.6)	2 (1.7)	1 (0.9)	3 (2.4)	4 (2.8)
Pittosporum viridiflorum	4 (3,5)	1 (0,5)	2 (1,7)			
Leucosidea sericea		2 (1,0)				
Cliffortia sp.	1 (0,8)	9 (4,7)	8 (7,0)	1 (0,9)	2 (1,6)	
Rhus spp.	21 (18,8)	47 (24,7)	14 (12,2)	16 (13,9)	9 (7,1)	16 (11,2)
Maytenus sp.					1 (0,8)	
Rhamnus prinoides	1 (0,8)	5 (2,6)				
Rhoicissus tridentata			7 (6,1)	7 (6,1)		17 (11,9)
Passerina montana	2 (1,8)	5 (2,6)	1 (0,9)		2 (1,6)	1 (0,7)
Erica spp.	11 (9,8)	28 (14,7)	16 (13,9)	8 (7,0)	3 (2,4)	18 (12,6)
Olea africana	61 (54,5)	58 (30,5)	59 (51,3)	77 (67,0)	106 (83,5)	82 (57,3)
Buddleia spp.		6 (3,1)		1 (0,9)	1 (0,8)	
Unidentified Type A	2 (1,8)	6 (3,1)	1 (0,9)	3 (2,6)		1 (0,7)
TOTAL	**112**	**190**	**115**	**115**	**127**	**143**

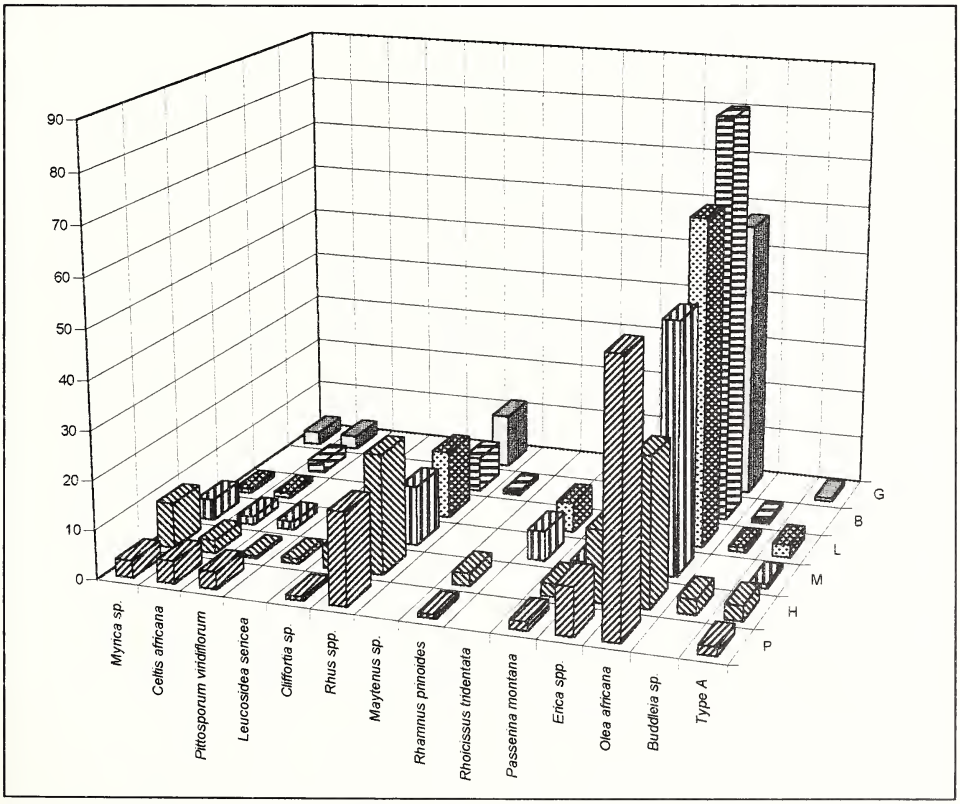

Table 6. Twyfelpoort: frequencies of identified woody taxa from charcoal analysis.

FAUNA

The late Holocene period evidences low temperature fluctuations around the present-day mean at most sites (Vogel 1983), and marks the formation of modern biogeographical community alliances. Hence the dry southern woodland savanna vegetation of the Free State as we know it today supports now, as it did then, a 'package' or 'community' of animals restricted to this type of habitat. In this environment wildebeest and springbok, for example, favour the open plains, whilst aardvark and warthog show a preference for open woodland and scrub grass terrain. Klipspringer, reedbuck and hyraxes are to be found in the mountainous rocky habitats. A review of recently excavated LSA sites in the Free State (Wadley 1992, 1995; Plug & Engela 1992, Esterhuysen *et al.* 1994, Klatzow 1994) shows the Twyfelpoort fauna to be in keeping with the faunal assemblages from other Holocene sites.

Table 7 represents the identifiable faunal remains from the combined 1993 and 1996 excavations. The previous faunal sample was re-analysed by Backwell at the Transvaal Museum, and combined with the most recently excavated material to produce one working sample. It should be noted that a percentage of the fragments designated as 'indeterminate bovid I, II and III' (after Brain 1974) is most probably identifiable to species level by a professional faunal analyst.

Of the eleven levels recognised, only four contain large faunal samples. The B and G level fauna suggest a marked preference for the hunting of larger mammals (Fig. 7). Through time, the number of smaller game and collectable items increased, and an intensification of local resource exploitation is seen in the L level at about 1880 BP. The introduction of *Ovis* (sheep) in the H level coincides with increased sedentism and social complexity, and marks the beginning of indigenous economic change. The decline in birds, fish, warthog, primate, equid and bovid remains in the most recent levels may indeed reflect this.

A cursory analysis of tooth wear and bone fusion indicates that the human occupants of the site practised

Table 7. Frequency of faunal fragments and (MNI) identifiable to species level in each stratigraphic level (combined 1993 and 1996 data).

SPECIES	LEVEL			
	H	L	B	G
Lepus sp. (hare)	3(2)	6(1)		
Hystrix sp. (porcupine)		1(1)		
Equid sp. (horse /zebra)			1(1)	
Canis mesomelas (black backed jackal)	1(1)	6(1)	4(1)	
Herpestinae sp. (mongoose)	2(1)	2(1)		
Hyaena brunnea (brown hyaena)		4(1)		
Papio sp. (baboon)	1(1)	1(1)		1(1)
Ovis aries (sheep)	1(1)			
Procavia capensis (hyrax)	26(3)	34(4)	12(2)	3(1)
Orycteropus afer (aardvark)		3(1)		
Phacocoerus aethiopicus (warthog)	3(1)	15(1)	6(1)	2(1)
Oreotragus oreotragus (klipspringer)	2(1)	7(1)		
Silvicapra grimmia (duiker)		4(1)		
Raphicerus campestris (steenbok)	3(1)		2(1)	
Pelea capreolus (grey rhebok)	4(1)	3(1)		
Damaliscus dorcas (blesbok)		13(2)	4(1)	
Antidorcas marsupialis (springbok)	5(3)	9(2)	2(1)	1(1)
Redunca sp. (reedbuck)	4(2)	13(1)	1(1)	
Connochaetes sp. (wildebeest)	4(1)	15(2)	2(1)	1(1)
Alcelaphus sp. (hartebeest)		3(1)	1(1)	
Indet Bov. I	12(1)	28(2)	12(3)	4(1)
Indet Bov. II	54(2)	115(4)	46(2)	29(2)
Indet Bov. III	7(1)	37(2)	13(2)	5(1)
Indet aves	2(1)		4(1)	1(1)
Indet mollusc (fresh water mussel)	1	1	2	1
Indet pisces	1(1)	9(1)	1(1)	
Indet rodent	26(3)	81(4)	19(2)	6(1)
Reptile	2(1)	10(1)		
Frog	6(2)	46(3)		
Tortoise			1(1)	

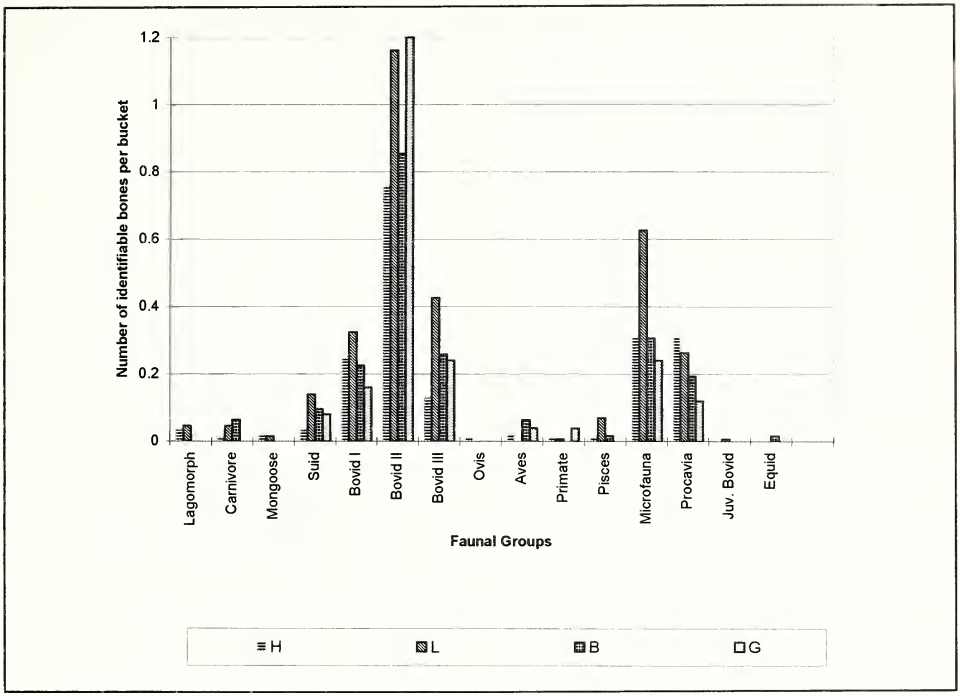

Fig. 7. Twyfelpoort Shelter: number of identifiable bones per bucket, and density per level.

selective hunting, with a significant proportion of the sample either juvenile or aged. Although the faunal samples do not prove or disprove winter occupation, the high percentage of juvenile animals does suggest that the shelter was used during summer.

Carnivore damage in the form of large punctate depressions on two bone fragments, suggests that carnivores also made use of the shelter, and have therefore contributed to the faunal samples. Leopard are known to show a preference for medium sized antelope, but will willingly take smaller animals like baboon and hyrax (Brain 1981). The carnivore-damaged bones found in the L and B levels coincide with high numbers of springbok or class II size bovids, as well as hyrax remains. In the light of these findings one cannot rule out the possibility of some leopard activity at the shelter.

Figure 8 reflects bone density per level. In spite of the fact that bone mass is not a reflection of protein consumed prehistorically, data on the density of bone per level do act as a good indicator of social behaviour, especially for recognising aggregation and dispersal phases in the archaeological record. Using the Basarwa as an ethnographic model, the presence of markedly higher bone densities and formal tools in an occupation phase should be indicative of aggregation, where people share hunted game, make and exchange gift items, partake in ritual activity and broker marriage alliances.

The list of identifiable faunal species indicates that a wide range of procurement strategies were practised, with resources from the plains, kloofs and rivers successfully exploited. Intensification of smaller collectable animals appears to occur in the L level.

DISCUSSION

The evidence from Twyfelpoort Shelter indicates interaction between its Basarwa inhabitants and both black and white farmers. The M level contains the earliest evidence of interaction in the form of pottery fragments obtained from black agriculturalists. The stone tools from this level do not indicate any major changes in hunter-gatherer lifestyle as a result of this interaction. Although the frequencies of formal tools are significantly lower in the M than in the L level, the hiatus between the two levels prevents us from expecting any kind of continuity in the record.

The H level represents interaction with white farmers in the form of large amounts of peach pip, though it should not be assumed that interaction with black farmers ceased at this time. The sharp increase in formal tool frequencies in this level could be interpreted as an increase in ritual as a response to stress. Comparable

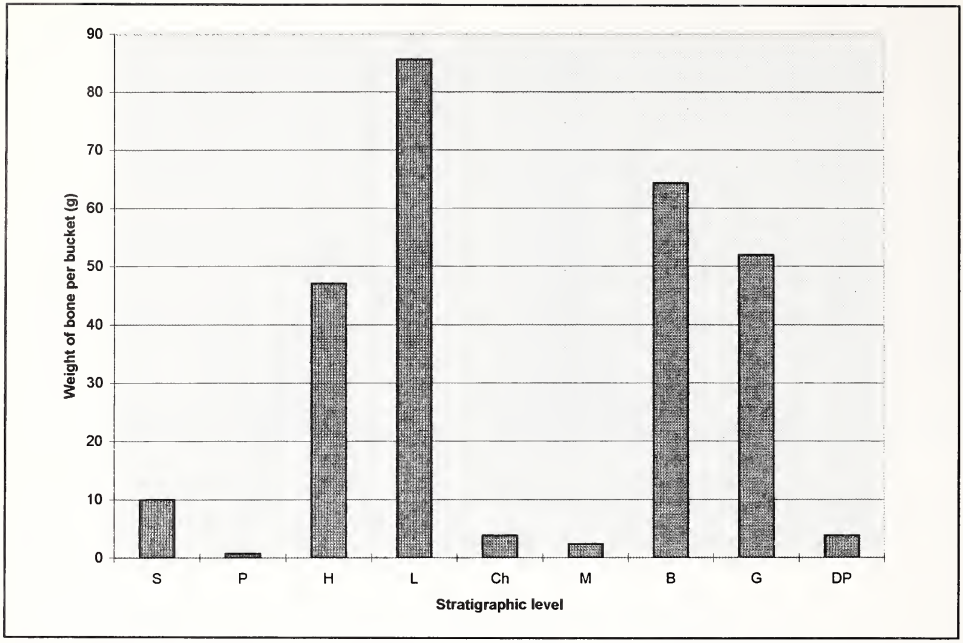

Fig. 8. Twyfelpoort: bone density by stratigraphic level.

increases in formal tools, for use in gift exchange, have been documented at other interaction sites, such as Jubilee Shelter in the Magaliesberg (Wadley 1989:49). This interpretation is supported by the fact that, whilst the use of opaline drops substantially in the ceramic levels, it is still used for the manufacture of scrapers, which were probably gift exchange items. The overall decline in the use of opaline is possibly indicative of a restriction on hunter-gatherer mobility and access to resources, the source of the stress.

The low frequencies of stone tools in the P level, the last phase of occupation, may represent the dissolution of the Basarwa group. This could have been a result either of the social change produced by interaction, or the members of the group moving out of the shelter to live in the farming communities for which they worked. The shaman's paraphernalia found in this level may represent the final ritual coherence of the group before its dissolution.

The nature of the relationship that existed between the Basarwa and the black and white farmers is hard to define by reference to the archaeological evidence. The outcome of the interaction, the disintegration of the Basarwa group, could have been the result either of a symbiotic relationship that the Basarwa willingly took part in, or of a relationship in which the Basarwa people were exploited by the farmers. Since the Basarwa group did not leave the area as a response to interaction, we find it more likely that the relationship with the farmers was one benefitting both groups. Labour was probably traded for peaches from the white farmers, and goods, such as animal skins and hunted meat, or labour given to the black farmers in exchange for domestic carbohydrates. This kind of cooperative interaction between hunter-gatherers and farmers is comparable to that evidenced in Jubilee Shelter in the Magaliesberg (Wadley 1996).

In terms of the pre-interaction occupation of the site, the L is the only level which might be interpreted as a period of aggregation at the site, through reference to Wadley's (1989) characterization of aggregation and dispersal phase settlements in the LSA. The L level contains high frequencies of formal tools, as well as the largest frequencies of hunted faunal remains, worked bone and ostrich eggshell. The paintings on the wall of the shelter, associated with ritual activity such as trance, lend support to this interpretation.

Twyfelpoort Shelter has the potential to add substantially to our knowledge of hunter-gatherer interaction with farmers in the eastern Free State, however, not much information about the nature of the interaction can be gleaned from only a few LSA sites in isolation. Consequently, excavation of both black and white farming community sites in the eastern Free State would be of value in supplementing the evidence from shelters such as Twyfelpoort.

The Twyfelpoort site with its good preservation and relatively dense deposit holds promise for archaeologists interested in the Holocene and perhaps even earlier. The site has already proved to be a good correlate for other Free State sites and, depending on its depth when it is eventually excavated to bedrock, could be invaluable for cross-dating events at sites like Rose Cottage Cave, one of the few inland sites with a deep deposit.

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The 1996 excavation and analysis of Twyfelpoort was undertaken as part of the third year Archaeology Department field school. Our thanks go to our lecturer Professor L. Wadley for supervising the excavation of Twyfelpoort Shelter, the analysis of the material and the writing of this paper and for preparing the paper for publication; and to Amelia Clark for her help on the excavation and in the laboratory. We also thank Dr I. Plug for help with the faunal analysis, A. Esterhuysen for comments on the charcoal identifications and K. Sales for redrawing Figures 1-3. Dr J. Vogel provided the radiocarbon dates.

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TWIN CAVES: AN EARLY MIDDLE STONE AGE SITE NEAR CLARENS, EASTERN FREE STATE*

PHILIP THOMAS HARPER

Department of Archaeology, University of the Witwatersrand
Private Bag 3, P.O. WITS 2050, Johannesburg

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ABSTRACT

The undated Middle Stone Age (MSA) assemblage from the south entrance of Twin Caves, on the farm Schaaplaats, Clarens, contains artefacts that link it to the earliest expression of the MSA. Using the Volman classification scheme this places the assemblage within the MSA I. Only four other South African sites have assemblages that can be considered MSA I.

INTRODUCTION

Twin Caves are situated on the farm Schaaplaats, near the eastern Free State town of Clarens (28.34S; 28.27E). The linked caves are situated at the top of a hill overlooking a small perennial stream. The caves face due west and both measure 35 m by 30 m. One of the caves, that in the south, has Iron Age walling in it. The deposit is composed mainly of decomposed sandstone, which forms the bedrock of the caves.

The test excavation in the northern cave, which has no walling, is part of the Rose Cottage Cave Project which aims to find sites in the area with deep deposits and long sequences. Rose Cottage lies approximately 120 km south-west of Twin Caves.

THE EXCAVATION

Excavation began near the dripline in the southern side of the cave. This choice was made because the front of the cave is well lit and has stone tools washing out of the dripline deposit. Excavation began in squares Aa-Ac (Fig. 1) and continued to a depth of 0,5 m. The first 50 mm consisted of a dung floor because the cave was recently used for sheltering goats and cattle. The following 450 mm showed no definite stratification and yielded only a few stone pieces which appeared randomly in the semi-sterile deposit. Square Ah, the surface of which was about 1,4 m lower than the excavated base of Ab, was also excavated. In Ah there was a sterile surface layer of 400 mm followed by a dense occupation level of 200 mm which rested on bedrock. All the artefacts from the excavation were derived from this one square. Although the excavation falls well within the dripline, the roof of the cave is extremely high at this point (15 m) making the site more an open one than a cave site (grass was growing vigorously on the surface). Five pottery fragments and one bone fragment were recovered from the surface. This is not surprising considering the proximity of the large Iron Age site in the adjoining cave.

STONE ARTEFACTS

The artefacts were analysed using Singer and Wymer's 1982 scheme with the following amendments: first, I define flake-blades by size starting from 26 mm with increments of 10 mm and, second, flake-blades with lengths smaller than 26 mm are called bladelets.

A total of 850 stone artefacts was recovered (Table 1). There are no formal tools and only five pieces have visible utilization marks. Chunks comprise 60% of the lithic collection but no chips were present suggesting that these may have been winnowed from the site by the action of water. Flakes are the next most common artefact (21%), followed by cores (12%). Sixty-eight per cent of the cores are irregular but there are a few blade and disc cores. Most of the flakes are thick, broad and round in appearance (Fig. 2), and there are none of the triangular flakes that typify early MSA coastal assemblages (Singer & Wymer 1982). The flakes appear almost disc-like regardless of whether they are made on tuffaceous or opaline rocks. Eighteen per cent of flakes exhibit faceted platforms (Table 1, Fig. 2). Flake-blades make up a small (7%) and mixed collection varying in type and raw material (Table 1), and bladelets comprise only 0,5% of the total assemblage. Opaline makes up 59% of the rocks used at Twin Caves.

DISCUSSION

The dense MSA site positioned at the entrance of the cave may have been disturbed by water action which removed the chips downslope.

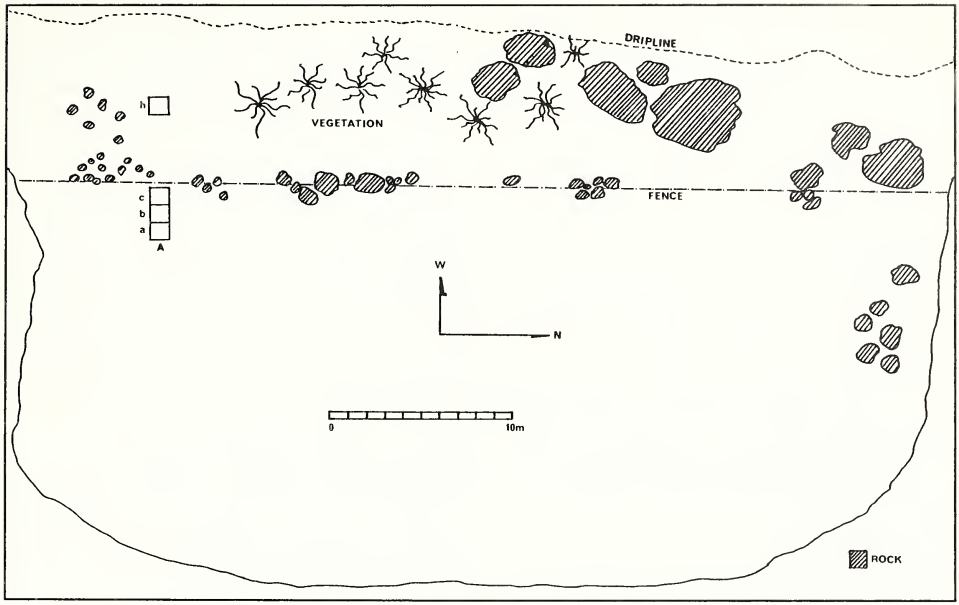

Fig. 1: Plan of the southern cave, Twin Caves.

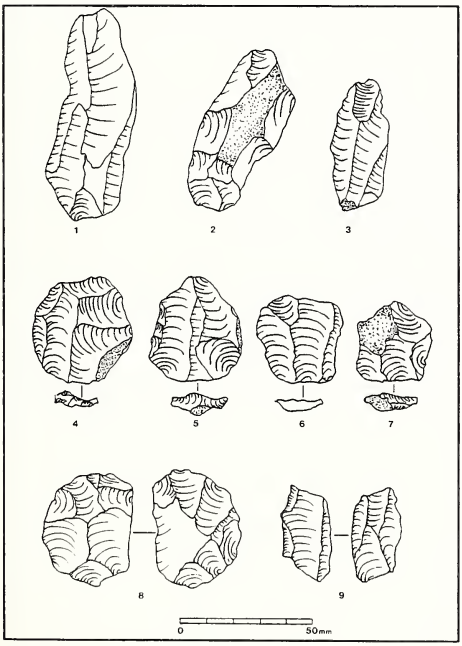

Fig. 2: Stone Artefacts from Twin Caves: 1-3 flake-blades; 4-7 flakes.

The artefacts are not easily placed into any of the 'traditional' MSA typologies. There is nothing resembling this collection in the entire Rose Cottage MSA sequence which, using Volman's 1984 terms, spans MSA 2a, Howieson's Poort, MSA 3 and a final expression of the MSA (Wadley & Harper 1990, Harper 1994). Both Twin Caves and Rose Cottage assemblages are manufactured predominantly on tuffaceous and opaline raw material, but the Twin Caves flakes and flake-blades are much larger and rounder than those found in any of the MSA levels at Rose Cottage Cave. In Rose Cottage only the basal level LEN, probably dated older than 100 000 BP, contains more large (>30 mm) than small flakes (Harper 1994). LEN, however, has fewer faceted platforms and more flake-blades than Twin Caves. Twin Caves also has far fewer bladelets than any of the Rose Cottage MSA levels.

If Volman (1984) is correct in his assessment of time-related technological change in the MSA then I suggest that, on the basis of tool typology, the Twin Caves MSA is older than the MSA occurrences at Rose Cottage and it may belong to the MSA I. MSA I is a problematic MSA stage that has been recognised at only a few South African sites: Duinefontein 2, Peers Cave, Elands Bay Cave and possibly Bushman Rock Shelter. These MSA I assemblages are characterized by little formal retouch, a high proportion of cores for the production of flakes with intersecting dorsal scars and small, broad flakes, some of which have faceted platforms. Denticulates are the most common retouched tools (Volman 1984:201).

At Twin Caves there are no formal elements, not even

Table 1. Twin Caves, Schaaplaats: stone inventory.

	sandstone	tuffaceous rock	opaline	other
Chunks	69	123	263	53
Cores				
disc	6			
blade		5	10	
core reduced			1	
irregular	1	8	68	1
Flakes (*faceted platform)				
<25 mm		10+2*	41+8*	
26-35 mm	2	20+1*	23+6*	1*
36-45	6+1*	12+4*	7+6*	
46-55 mm	5	9+4*	2	
>55 mm	7	1		
Flake-blades				
Parallel <35 mm		1	2	
Parallel <45 mm			1	
Irregular <35mm			8	
Irregular <45mm		5	4	
Irregular <55mm			2	
Irregular <65mm	1		1	
Irregular >65mm	1	3		
Pointed <45 mm			1	
Thick Triangular				
<35 mm			1	
<45 mm		1	3	
<55 mm		3	1	
<65 mm		1		
Cortical <35 mm			1	
Cortical <45 mm			2	
Broken distal				
Broken proximal	1	2	2	
Broken medial			7	
Bladelets			4	
Utilised pieces			5	
TOTAL	**100**	**215**	**480**	**55**

denticulates, but there are disc cores and small, broad flakes, some of which have faceted butts. Opaline is used less frequently at Twin Caves than at Rose Cottage Cave where opalines usually comprise more than 90% of the rock types. The lowest percentage of opaline in the Rose Cottage Cave MSA is 80% in the pre-Howieson's Poort basal levels of the sequence. Nonetheless the proportion of opaline at Twin Caves is not low enough to explain the small flake-blade production.

Given the dating techniques presently available has not been possible to date the Twin Caves MSA assemblage. It is also not possible to seriate it relative to other MSA industries within the South African MSA sequence because it is a single assemblage within a single stratum. This makes the placing of Twin Caves within the MSA I stage controversial, particularly because some archaeologists (Parkington 1990) disclaim a time related, uniform sequence of industries in the MSA.

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CLAY 'FIGURINES' FROM THE RIET RIVER: A CASE OF NATURAL SITE FORMATION*

J. DREYER

National Museum, P.O. Box 266, Bloemfontein, 9300

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ABSTRACT

A concentration of vitrified clay objects resembling the baked hut rubble on Late Iron Age living sites was examined. The feature was excavated and analysed and led to the conclusion that the occurrence was the result of the spontaneous burning of plant material accumulated by floods. These clusters were fired by natural combustion and produced the cinder 'slag' and peculiar moulded clay objects. The paper aims to put the occurrence on record and to render a word of caution to researchers when accounting for slag from Iron Age archaeological sites.

INTRODUCTION

Type R or Khoi settlements along the Riet River between Jacobsdal and Koffiefontein in the south-western Free State, dating from the 16th-19th centuries, have been described by Maggs (1971,1976) and Humphreys (1973). The area is also known for its abundance of early Khoi burials (*cf.* Van Riet Lowe 1929, 1931; Wells & Gear 1931; Humphreys 1970; Humphreys & Maggs 1970).

During excessive rains in February 1988 and again at the beginning of 1989, human skeletal remains were exposed by flood waters at Pramberg on the banks of the Riet River near Jacobsdal. These exposures were reported to the National Museum, Bloemfontein, leading to rescue excavations in September 1988 and March 1989 (Brink *et al.* 1992).

In search of further occurrences of exposed skeletal material, the south bank of the River was examined for several kilometres upstream from Pramberg towards Koffiefontein. Although no burials were found during the fieldwork, it was alarming to witness the amount of flood damage to the stone-walled settlements. Various sites were severely disrupted, while others were almost totally covered by the alluvial deposit.

A concentration of baked clay and 'slag' was discovered a few kilometres down stream from the Pramberg burials. The feature resembled the remains of a hut or lelapa wall such as characterise the Iron Age settlements on the Highveld (*cf.* Maggs 1976, Dreyer 1992). This presumption was supported by the recording of Type R stone-walled settlements in the area and on the farm Pramberg in particular (Humphreys 1972:21).

It was decided to investigate the occurrence for possible human occupation. The investigation included an excavation at the spot and an analysis of the 'slag'. A visual comparison of the clay objects with a cross-section of the reeds from the river bed was also done. This paper describes the finds in general and considers the significance of the burnt clay objects.

THE SITE

The site containing the burials is located on the farm Pramberg 15, about 24 km south of the town of Jacobsdal (2924BB). The farm borders on the Riet River, and the conical hill, Pramberg (29.13.38S. 24.46.52E.), adjacent to the River, forms a very prominent landmark in the area. On the west bank of the Riet River another range runs from Pramberg parallel to the river downstream in an easterly direction (Fig. 1).

The geology of the area has been discussed by Humphreys (1972). The environment consists mainly of layers of the Ecca and Dwyka Series of the Karoo system which are overlaid here by the Ventersdorp System. Exposed dolerite dykes and sills which intruded into the softer sedimentary layers of the Karoo System produced the many characteristic dolerite ridges and koppies of this region (Fig. 2).

The Riet River derives its name from the abundance of reeds, mainly *Phragmites australis*, which flourish along its banks. The area forms part of the false upper Karoo vegetation (Veld Type 36, Acocks 1988). Intruding *Acacia* species are found along the banks of the Riet River and on the flood plains near the stream bed. Large bundles of driftwood and reeds were accumulated by the floods against the vegetation and barbed wire fences. Several converging dongas were scoured into the slope towards the river bed (Brink *et al.* 1992).

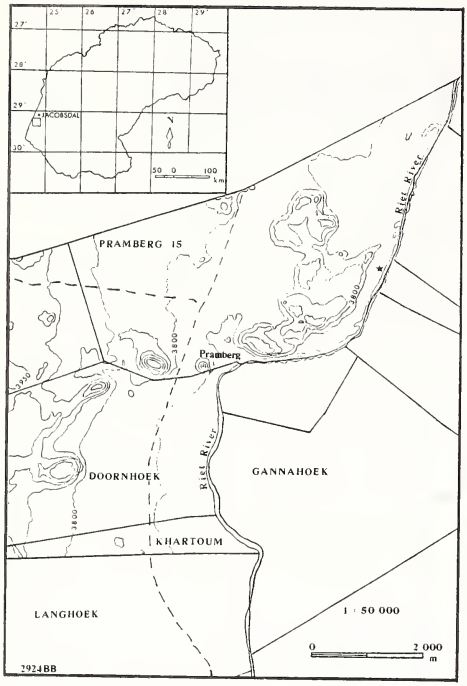

Fig. 1. Location of the site.

FEATURE

About 4 km downstream from Pramberg a concentration of burnt clay and vitrified 'slag' was found on the surface at the foot of the range about 150 m from the river bed (Fig. 3). The debris was spread out evenly in a half circle of about 2,5 m diameter. The accumulation consisted of unidentified baked clay objects and nodules of porous, vitrified clay (Fig. 4) resembling slag (Friede & Steele 1980). The whole feature looked like the remains and debris of structures of human occupation which were described by Maggs (1976) and Dreyer (1992) dating from the Late Iron Age. Chunks of charcoal and pieces of burnt twigs and branches were strewn about. A few Later Stone Age flakes and the odd tool of lydianite or indurated shale and agate were scattered in the donga nearby. Of particular interest were two rather large side scrapers (measuring 8 x 7 cm & 6 x 4 cm) with secondary retouch. The highly contaminated state of the deposit was clear and disputed any significance in the presence of these flakes. They were, therefore, not collected. No potsherds or any other cultural material were found on the surface.

INVESTIGATION METHODS

Although none of the previous surveys (Maggs 1971, Humphreys 1973) recorded pastoral settlements on the

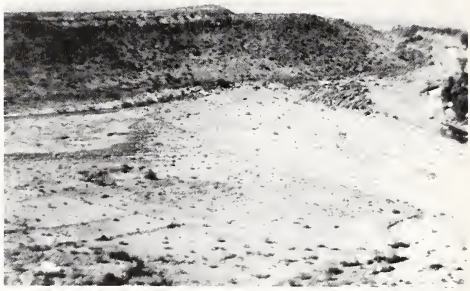

Fig. 2. View from the top of Pramberg along the Riet River. Previously desribed human remains were recovered from the area in the foreground. The present site is located near the river to the far right.

Fig. 3. General view from the ridge. The river is marked by the row of tall trees, while the arrow (centre) indicates the locality of the clay finds.

Fig. 4. Burnt vitrified clay on the surface.

1 km of the river in association with the dolerite actual flood plain, some settlements were in fact withinoutcrops which characterise the area (Humphreys 1988). In view of this it was decided to treat the occurrence with caution. It was argued that the river could have altered or widened its course somewhat during the floods, distorting the actual evidence of events regarding the feature. The occurrence was seemingly out of context, but it was

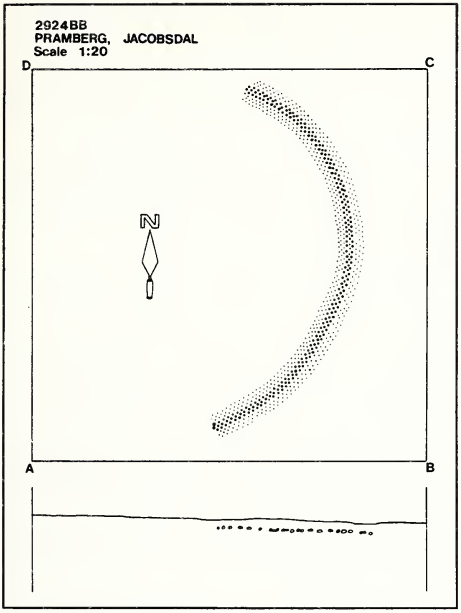

Fig. 5. Plan and profile of the excavated feature.

nevertheless investigated to ascertain its possible relationship.

A 3 m^2 square was plotted over the burnt clay feature selected to include the biggest concentration of visible 'slag' and clay objects. The deposit was excavated in 5 cm arbitrary layers. The second layer was eventually abandoned due to the rapid decrease in material until it became totally sterile. The sandy deposit was easily removed and was sifted as a single unit. Ashy burnt soil and clay objects were concentrated towards the centre of the square to about 5cm below the surface. No further material was found in what appeared to be a sterile alluvial deposit without any stratigraphy (Fig. 5).

Many of the clay objects are cylindrical or halfmoon shaped. Faint grooves in parallel lines on the ventral surface produce a moulded appearance. The objects were compared to sections of reeds (*Phragmites sp.*) recovered from the immediate vicinity (Fig. 6).

Other clay objects are of no particular uniform shape or size. They have a porous texture (Fig. 6) and are very light in mass. These vitrified chunks resemble cinders from the fused residue of burnt organic materials. The vitrification and bubbly texture of the cinders could indicate that a relatively high temperature was reached over a short period of time. The cinders could be either iron-free or with a low iron content (Friede *et al.* 1981). An analysis of the 'slag' was done at the Geology Department, University of the Orange Free State, Bloemfontein. The results are given below (Table 1).

Fig. 6. Some of the burnt clay objects exhibited together with reeds and cinders. Note how the 'figurine' fits into the reed mould.

The findings compare favourably with analysis of cattle byre deposits and iron slag remains from various other Iron Age sites (Dreyer 1992:325). Although the same high silica content is shown, there is neither further evidence of the presence of metal-working nor historical proof or any other indication of iron-working communities in the area. The close resemblance in the results brings doubt to the presumption of metal slag from many Later Iron Age sites on the Highveld (*cf.* Dreyer 1992:320).

Table 1. SLAG ANALYSIS

Main components		Trace elements parts/million	
SiO_2	70,37%	Rb	95
TiO_2	1,01	Sr	217
Al_2O_3	14,06	Y	31
Fe_2O_3	5,24	Zr	409
MnO	0,12	Nb	13
MgO	1,84	Cu	36
CaO	2,90	Zn	40
Na_2O	1,59	Ni	46
K_2O	2,40	Co	20
P_2O_5	0,14	Cr	138
H_2O	0,16	V	123
LOI	0,06		

DISCUSSION AND CONCLUSION

With regards to the 18th-19th century occupation of the sites along the Riet River, there is clear evidence of trade and cultural contact with Tswana groups to the north since about 1500 (Humphreys 1988). This perception and the social and cultural interaction within the area suggested the possible presence of structures of perishable materials as used by Sotho/Tswana peoples during the Iron Age (Maggs 1976, Dreyer 1992).

The origin of the 'slag' concentrations became clear after the archaeological investigation gave proof of the absence of any human involvement in the manufacturing of these objects. Further indications of iron-smelting or smithing were likewise not found. No correlation with cultural remains from Type R could be made, although stone walls at Pramberg have been classified as part of the Type R settlement layout (Humphreys 1972).

Even though the burnt clay objects and vitrified nodules at Pramberg superficially resemble clay objects and slag associated with human activity, the origin due to natural causes could be explained satisfactorily in this case. It is presumed that sludge penetrated cracks in the reeds, filling the centre of the internodes almost to capacity before they were fired, thus producing the moulded clay objects.

A bundle of debris which obstructed the gateway of a fence nearby was deliberately set alight by the landowner. The residue of this fired bundle produced moulded objects and cinders exactly resembling the finds from the excavation. Veld fires of this kind during the time after the floods were confirmed by the owner of the farm. Several other concentrations of burnt clay were later found some distance away from the River.

The present experiment seems to support Friede's (1981:39) word of caution to scientists in the interpretation of slag occurrences at Iron Age archaeological sites. Not all surface slag finds endorse the interpretation of being proof of prehistoric iron-working. Supporting evidence for iron-smelting in the form of tuyère fragments, pieces of ore and furnace remains should be present to justify the claim.

ACKNOWLEDGEMENTS

Thanks are due to Mr I.P. Maas, owner of the farm, for reporting the occurrences to the National Museum and for permission to excavate on his land, and to Kevin Preddy who had to bear with us during the field work. I gratefully acknowledge the assistance given by Klaas and Daniel Mphafi during the excavations, Sharon Holt who did the drawings and Rentia Luwes for producing the photographs. Comments by Sandra Bishop and James Brink improved the draft. Dr Willem van der Westhuizen at the Geology Department, UOFS, Bloemfontein, analysed the slag sample.

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BOOK REVIEW

THE ROCK ART OF THE GOLDEN GATE AND CLARENS DISTRICT
by Bert Woodhouse. 1996. William Waterman Publications: Rivonia. (R89,95)

GEOFFREY BLUNDELL

Rock Art Research Unit, Archaeology Department,
University of the Witwatersrand, Private Bag 3,
P.O. Wits 2050, Johannesburg

Bert Woodhouse, together with his colleague Neil Lee, has probably seen more rock art sites in South Africa than anyone else. Over the years, the material that these two enthusiastic workers have gathered has been published in a number of books and articles. Their work has served an important end in bringing so much of the imagery to the attention of the general public. Woodhouse continues with this important task in his most recent publication.

The book begins with "A visual reference gallery" of 61 colour plates. Most rock art books either have the colour plates dispersed through the text or, in cases where cost is a consideration, the colour plates are placed together at the end of the book. I found the position of the colour plates at the front of the book appealing. The images raise expectations and capture the reader's imagination.

The rationale for including certain pictures is, however, not evident. Plate 25, for example, is of a guest farm at Sunnyside taken in 1974! (No photograph of the guest farm at present is provided). There are other plates too that could have been excluded in favour of pictures of the rock art itself. Moreover, some of the plates are partly out of focus (for example, Plates 36, 47, 48). With the cost of so thin a book being so high, one expects that the author and the publishers would have maintained a rigorously high standard.

Apart from the "visual reference gallery" of colour plates, the rest of the book is illustrated by means of black-and-white photographs and, in one or two places, tracings. The tracings are poor and lack detail. Moreover, the black-and-white photographs (reductions from colour slides?) are seldom clear, and the reader struggles to see many of the images that are referred to in the text.

Apart from these minor points, Woodhouse's book raises two important issues for rock art research. The first is that of interpretation. Throughout the book Woodhouse employs at least five interpretations. These are:

a) Hunting Magic

Considering a now-famous painting of two crabs surrounded by a line (Dowson, T.A. 1988. World Archaeology 20:116-128), for example, Woodhouse (p. 48) comments, "...both caught in a trap which may indicate the outcome desired by the artist and his audience".

b) Shamanic Interpretations

In what appears to be a turnaround from his earlier position, Woodhouse makes extensive use of shamanic interpretations. Many of his interpretations - perhaps too many - stress the relation of the imagery to rain-making.

c) Daily Narrative

Commenting on a group of women surrounded by dots and flecks, Woodhouse (p. 76) rejects Dowson's neuropsychological explanation of these as entoptic phenomena (he does not say that Dowson argued that the San probably saw these entoptic phenomena as depictions of potency). Instead, he states, "[t]he more realistic explanation of a recently arrived group joining a feast seems a possibility...". Woodhouse does not, however, address the issue of how one recognises "realism" in the art.

d) Exotic Interpretations

In one place, Woodhouse (p. 55) suggests that paintings of figures in long white "gowns", may indicate the presence of Arabs. Although he admits that this is a flight of the imagination, he provides evidence in the form of Pedi ethnography to support his view. He does, in other words, entertain this as a serious possibility.

e) Eurocentric Interpretations

In some places, Woodhouse interprets images in terms of widely-held stereotypes. For example, he comments on a painting (p. 76) that partly comprises two red human figures, one short and the other tall: "[i]t provides further evidence of the mixing of different groups of people, notably blacks and Bushmen". Without any diagnostic features such as shields and so forth, and in light of the fact that the San painters did not use size realistically, surely this interpretation is nothing but guesswork based on stereotypes of the San and their size? This sort of interpretation - guesswork without any supportive evidence - permeates many of his interpretations

throughout the book. In another place (p. 51, caption to figure 26), he interprets seated figures (that appear to my eye similar to other seated San figures found in the art) as appearing, for unspecified reasons, more like Isento-speaking people than San. In yet another place, Woodhouse, in an attempt to defend an earlier, discredited, interpretation of his of the same painting, suggests, again without supporting evidence, that the San domesticated rhebok (p. 87).

There is nothing wrong, in principle, in using more than one interpretation, but one should state clearly how one knows which interpretation is appropriate in what circumstances. Woodhouse, however, employs his five types of interpretation without discrimination. The issue raised by this *laisser faire* approach is this: what constitutes a valid interpretation of rock art? Do, as some extreme post-processualists believe, all interpretations have equal validity? If so, then interpretations that are clearly denigratory and have racist undertones to them - as do exotic interpretations - have to be allowed. Surely not. On the other hand if all interpretations are not equally valid, then what criteria do we use to decide which interpretations are appropriate and which ones not?

Of course, there is no easy answer to this question and, no doubt, it will be one that nags at the minds of rock art researchers for years to come. Nevertheless, I believe that the discipline has advanced far enough over the last two decades to secure at least some certainties. We know, for example, that the art was deeply symbolic, that it played an important role in San religion, that it negotiated political status and that it was implicated in gender and other social relations. We also know that the art was not simple narrative, art for art sake, or sympathetic magic and that it cannot be interpreted from a Eurocentric perspective. We have, in other words, already begun to place limits on interpretation. Those limits are presently defined by certain bodies of literature. These are ethnographical, historical, archaeological, neuropsychological and social theory writing. When interpretations are not supported by one or more of these literatures - as many of Woodhouseś are not - then, surely, they cannot be sustained.

The second important issue raised by Woodhouseś book centres on site management. Over the last decade or so, writers on rock art have not published the exact locations of rock art sites in books meant for the general public, or indeed even in academic journals. Usually, only the district is given. The reason for this is a simple and powerful one: when locations of rock art sites have been given in the literature, those sites have been visited by people and ultimately many of them have been damaged and some even destroyed. A recent (1996) alarming report submitted to the Natal Parks Board by Wahl, Anderson and Pftonhauer on the paintings of the Ndedema Gorge, the area made so famous by Harald Pager's book, shows how many of the paintings have faded since Pager published his book in 1971. In the past Woodhouse has himself withheld the locations of sites. He has broken his silence in this book - he has given detailed locations for people to find rock art sites. One can only ask whether any measures have been taken to ensure that there will be adequate supervision at all the sites mentioned. If not, and in the face of the overwhelming opinion of rock art researchers, why have the locations of these sites been published?

The exposure of the exact locations of rock art sites throws a dark cloud over the book and any other issues it may raise. I can only urge Mr Woodhouse, the publishers and anyone else so inclined, to stop revealing the exact locations of rock art sites.

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Southern African Field Archaeology: ambj@warthog.ru.ac.za
Johan Binneman: amjb@giraffe.ru.ac.za
Lita Webley: amlw@warthog.ru.ac.za

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EDITORS
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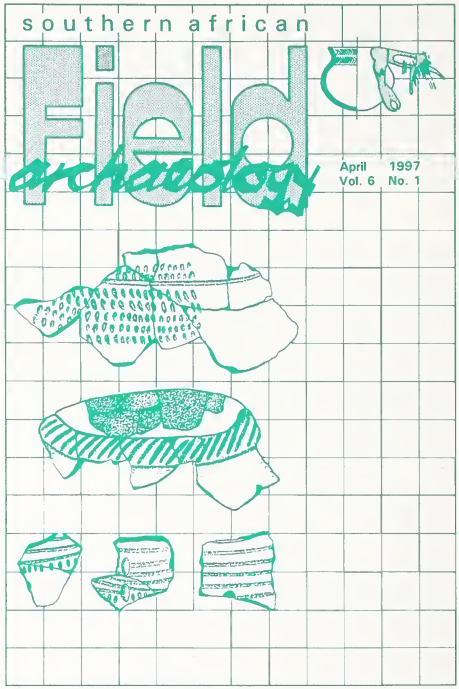

Cover illustration:
Decorated pottery from Jakkalsberg in the Richtersveld, Northern Cape, p. 3.

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ARCHAEOLOGY IN THE TRENCHES?

Southern African Field Archaeology is in its sixth year of publication. During this time a number of colleagues have aired their views in this column, which presents us with the opportunity of reviewing the relevance of their opinions in the light of the current status of the discipline. In this, and the next issue, I shall discuss some of these opinions.

In the inaugural editorial (1992:1) the editors addressed the future of archaeology in South Africa. We expressed the view that archaeology "had to re-evaluate its goals in order to remain 'relevant' in the construction of a new, non-racial society."

A similar view was expressed by Beth Wahl (1996), "archaeologists need to examine closely the emphases and structures of their research programmes" for archaeology to be socially and politically relevant in the future .

One way, we suggested, was via public educational programmes at grassroots level, geared towards schoolchildren of all ages and cultures. We were, and still are convinced that this is "one of the most important investments we as archaeologists can make in securing the future of the discipline in South Africa", and by so doing, creating an "audience that will be sympathetic to the cause of archaeology and that will in time advocate stronger support for the maintenance of archaeological posts and the creation of new ones".

After the SA3 conference in Bloemfontein in 1996, Beth Wahl reported that "it was clear that public education is a strong concern of many archaeologists. Increasing numbers of our profession are involved in *curriculum* content formulation, teacher and pupil training, and resource material production". The dramatic increase in emphases during the past few years through media of text books, popular articles, newspaper colums and television programmes on archaeology, are evidence of this new concern and awareness. In this regard the activities of the Southern

African Association of Archaeologists Education Standing Committee, have played a significant role in popularising archaeology, as did other institutions and individuals.

One of the direct results of these 'public eduction programmes' is the inclusion of archaeology in school text books. This in turn has resulted in a vibrant interest in prehistory throughout South Africa. Departments and archaeologists are inundated with requests to deliver talks on all aspects of archaeology, to provide resource material and to write popular articles.

Notwithstanding the successes of 'public archaeology' or 'educational/outreach approaches', South African archaeology in 1997 faces its biggest challenges to date. What must probably be the biggest shock and blow to the short history of professional archaeology in South Africa is the almost certain closure of the Archaeology Department at the University of Stellenbosch. Both editors are graduates of this department and are saddened by the thought of its possible closure. However, if this is the case, then several questions need to be asked. What are the reasons and why has this very serious matter not been brought to the attention of the Southern African Association of Archaeologists? Surely, while the decision may have been taken by the university to close the department, a formal letter of protest from the Association and members would have been the appropriate action. Although such action may not have any effect on reversing the decision, it is still better than to remain passive and silent on the issue.

There are also rumours that the Historical Archaeology Department at the Stellenbosch Museum as well as the Spatial Archaeology Unit at the University of Cape Town will shortly be closed. This, together with the incorporation of the Archaeology Department at the University of Pretoria into the Anthropology Department a few years ago, raises serious concerns regarding the future of archaeology in South Africa.
The only progress made on the academic front is the recent announcement that the Department of Anthropology and Archaeology at the University of South Africa, is planning to introduce a third-year course in Archaeology. This will enable students to major in Archaeology.

The question now is, what are we as archaeologists doing wrong, or what are we not doing? Despite all the successes with 'public outreach programmes' we are not convincing the decision-makers, especially at the universities, that archaeology is relevant in the new South Africa. This is a very serious situation with a 'snow ball effect'. General, but especially specialist training will be seriously affected. Furthermore, with fewer departments there are also less employment opportunities (see Duncan Miller 1993). This places more pressure on fewer archaeologists to be responsible for general public programmes, for outreach programmes among the disadvantaged communities and less time for research and publications.

When Hilary Deacon (1988) addressed the future of archaeology, and more specifically the problems that faced universities, we all shared his optimism (or silently hoped) that contract archaeology would be the answer to our problems. However, it would appear that almost ten years later, the goose that must lay the golden eggs has not come home to roost. We are still waiting for adequate legislation on impact assessments and although contract offices and individual units have benefitted financially from consultancies, the boom in the generation of new posts still has to materialise.

I will be continuing to discuss these matters in the next issue. In the mean time, you are welcome to send us your opinion on the future of archaeology in South Africa.

Johan Binneman
Department of Archaeology
Albany Museum
Grahamstown

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JAKKALSBERG A AND B: THE CULTURAL MATERIAL FROM TWO PASTORALIST SITES IN THE RICHTERSVELD, NORTHERN CAPE*

LITA WEBLEY
Archaeology Department, Albany Museum, Somerset Street, Grahamstown, 6139

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ABSTRACT

Radiocarbon dates from the open sites of Jakkalsberg A and B on the banks of the Orange River in the Richtersveld cluster closely around 1300 years ago, suggesting that they are broadly contemporary. Faunal remains are predominantly those of young sheep and the pottery may be characterised as typical of the Later Stone Age. Although the sites conform in certain respects to the pastoralist norms proposed by Smith *et al.* 1991 for the Western Cape, various discrepancies are discussed with the aim of expanding the debate on what constitutes a pastoralist site.

INTRODUCTION

Jakkalsberg A and B are two, large open sites on the southern banks of the Orange River (28.10.50S; 16.53. 15E), some 5 km from the gates of the Richtersveld National Park in the Northern Cape (Fig. 1). The background to the discovery of the sites in June 1992 and subsequent fieldwork in November 1992 have been detailed elsewhere (Webley in press; Brink & Webley 1996; Miller & Webley 1994). Although these sites are now open to the elements it is important to note that they were in the process of being first exposed by the wind when they were sampled. They had clearly been covered by the shifting wind-blown riverine sands soon after they were abandoned some 1300 years ago.

An initial appraisal of the sites with their large ceramic concentrations suggested that they represented pastoralist campsites. These open sites are also unique in the area in that they contained large numbers of faunal remains which presented an opportunity for examining the diet of the inhabitants. Furthermore, the distribution of stone and pottery remains over a wide surface allows an analysis of the spatial configuration of the sites with a view to comparing them to historical accounts and ethnographic observations on pastoralist camps. Since it is extremely difficult to locate and identify pastoralist campsites in the archaeological record, Jakkalsberg offered the possibility of resolving many unanswered questions.

One of the aims of the analysis was to test Smith *et al*'s (1991) claims with respect to identifying pastoralist sites based on criteria derived from excavating sites in the Western Cape. They have continued to assert (Yates & Smith 1993; Smith & Jacobson 1995;) their model of hunter-herder interaction over the competing views of Schrire (1992; 1993) and Kinahan (1994-5; 1995). Smith *et al*'s (1991) view is that herders and hunters

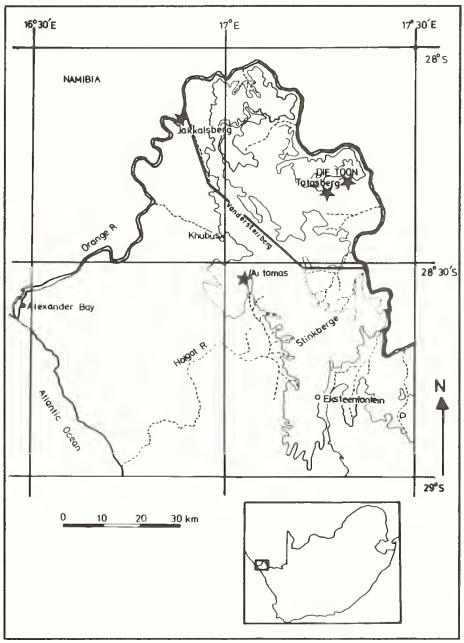

Fig. 1. Map of the Richtersveld, indicating borders of the National Park and the location of Jakkalsberg as well as other archaeological sites investigated in the area.

represented two quite distinct groups who "followed different but interrelated orbits" (Yates & Smith 1993:99) over a period of 2000 years. They have postulated that the nature of the relations between hunters and herders would have been unequal. The incursion of herders into the Western Cape would have driven hunters either into refugia in the mountains or else they would have been absorbed as client herdsman. They characterise hunter sites as having relatively large numbers of formal stone tools with an emphasis on fine-grained raw materials, large numbers of game remains, small ostrich eggshell beads and small numbers of ceramics. Herder sites, on the other hand, have an informal stone tool assemblage manufactured mainly of quartz and quartzites, large ostrich eggshell beads and high densities of ceramics and domestic stock.

They reject the hypothesis proposed by Elphick (1985), namely that hunters and herders "were part of a single group in a cyclical economic system that varied with the fortunes of the actors" (Smith *et al.* 1991). Schrire (1993), in her critique of Smith *et al*'s (1991) model noted that the signatures of herders and hunters are not invariable, and that sites do not neatly fall into one group or the other. Yates & Smith (1993) have responded that while there was probably an exchange of material culture between hunters and herders, this would have been a one-way trade "across a permeable economic and cultural "boundary" from herders to hunters" (*ibid*:97). While larger beads or ceramics distinctive of herder groups may on occasion be found on hunter sites they are able to distinguish between them "on the balance of other cultural traits" (*ibid*:98). In this description of material culture from Jakkalsberg, the sites are measured against the criteria set out by Smith *et al.* (1991) in order to determine whether the archaeological signatures of herders and hunters, which they claim to have indentified in the Western Cape, has wider applicability to other areas where Khoekhoen pastoralists are known to have settled historically.

METHODS OF COLLECTION AND EXCAVATION

During the initial rescue work at the site, the burial as well as a total of 81 square metres of material was collected from the area of densest occupational debris at Jakkalsberg A (Fig. 2). Hearth 1, exposed by the wind while we were working on the site, suggested that there was at least ten centimetres of deposit beneath the surface material. On returning to the site in November, a further 18 square metres was collected from the surface of site A so that a total of 99 square metres is represented in Figure 2. During the four months since our preliminary work, more material had been exposed by the wind, including three hearths. During follow-up work at site A, we collected material from 26 squares which we named sub-surface (SS) material. The division between surface and sub-surface material is quite arbitrary as there is no stratgraphic layering which would suggest that we are dealing with successive occupation of site A.

While we were undertaking a surface collection of material at site A, we noticed a concentration of similar material some 40 m to the south. The B site is bounded to the north by a small hill and to the west and south by a dry river bed (Fig. 2). Material from 38 square metres was collected and excavations undertaken in those squares (rows K, J and I) which abutted the hill. Although no visible stratigraphy was observed during excavations, some hearths were superimposed one above the other, indicating that the site was occupied on a number of occasions over a relatively short period of time. It was observed that lenses of dense bone and stone fragments were separated from each other by several millimetres of sterile soil. For this reason, the soil was removed in 50 mm spits, termed MOU (minimum occupation units) until the basal sterile soils was reached.

The deposit at both sites consists of fine, quartz-grained river sands which is constantly being redistributed by the prevailing westerly winds and the sparse vegetation in this area means there is very little humic accumulation. The deposit was characterised by several large chunks of shiny, shale which closely resembles specularite. However, Prof J. Moore, Department of Geological Exploration, Rhodes University, maintains it is a naturally occurring shale (representing an old Pleistocene River terrace) found along the banks of the Orange River. Even though outcrops of this stone were observed some 2 km upstream of the site, there are no outcrops in or around the site and the conclusion seems inescapable that these shiny shale fragments were in fact collected and introduced to the site. Some of these shiny shale fragments are coated in red ochre powder.

Burial

A number of large quarzite and granite stones indicated the position of the burial but the wind had removed the underlying sand so that the stones were found lying directly on top of the human remains. Only fragments of the skull, a number of teeth, and the upper arm and a scapula were still recognisable. The teeth suggested that the individual was probably approximately 4-5 years of age. Fragments of the skull were stained red and there was was a very high concentration of ostrich eggshell beads around the burial, many being very weathered. A total of 27 complete and 29 broken beads from only one square suggests that these beads are in fact associated with the burial rather than being a spill-over from the occupation of the main site nearby. This conclusion is supported by the mean diameter sizes of the beads which is discussed further below. The large number of quartz chips found in some of the squares, suggest that some of the adjoining artefactual material from the main site has been incorporated with the burial. Unfortunately, the contemporaneity of the burial with the open site can only be established by dating the human bones but they are too poorly preserved to attempt this.

Circular feature

The white 'dung' circle excavated in I34 contained small, worm-like tubes which may be due to the action of

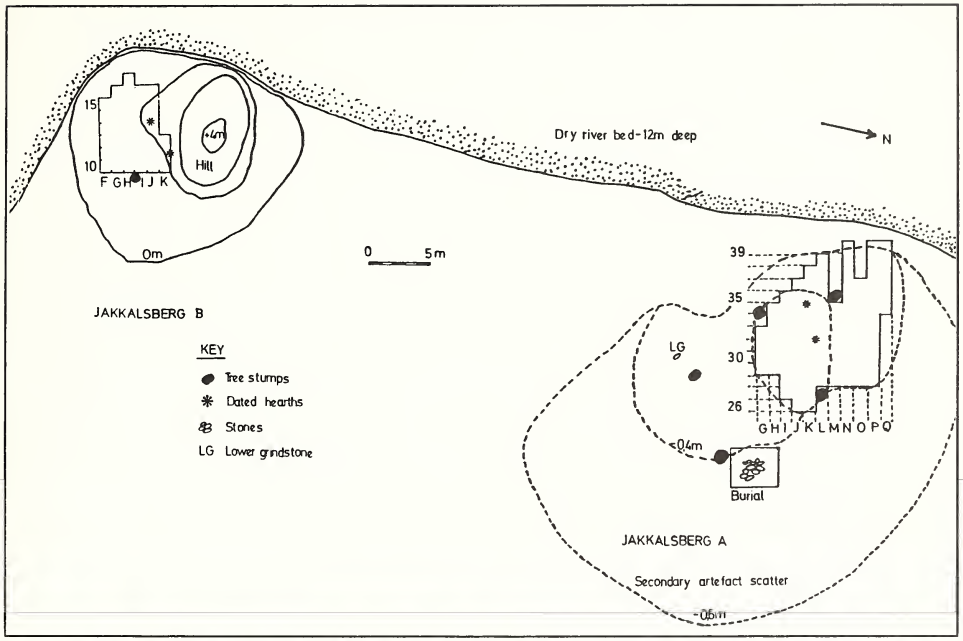

Fig. 2. Map of the location of Jakkalsberg A and B on the banks of a dry river bed, some 300 m to the south of the Orange River.

termites. The circle formed a crust, extending laterally beneath the loose brown soil and may be a small ash heap rather than a dung patch.

DATING

Hearth 1, exposed by wind during the initial visit to the site, was carefully cleaned out and the charcoal sent for radiocarbon dating. A date of 1330 ± 60 BP (Pta-5958), which calibrates to AD 664(691)783 was obtained. On re-visiting the site in November, it was observed that more objects on the sampled surfaces had been exposed by the wind, with a further three hearths being noted. They were plotted and charcoal collected. Hearth 2 dates to 1300 ± 25 BP (Pta-6100) and yields a calibrated date of AD 691(762)777. These two dates, from hearths only 4 m apart, suggest that the entire site represents a period of occupation in the 7th century AD. There is no evidence for earlier or later re-occupation of the site.

During preliminary collections at site B a hearth was observed on the northern edge of the small hill. After cleaning off the surface soil from this hearth in square K11, it was photographed and a charcoal sample taken for dating. It produced a date of 1420 ± 25 BP (Pta-6122), calibrated to AD 640(652)660. It is slightly older than the date obtained for hearth 2 lying across squares J13-J14 (MOU). A date of 1380 ± 50 BP (Pta-6101) was obtained from this hearth which is associated with a large fragment of iron (Miller & Webley 1994). The date is calibrated to AD 648(668)691 (J. Vogel pers. comm.).

CULTURAL MATERIAL

The stone artefact assemblage

The A site

The stone artefact assemblage from the A site contains very few formal stone tools. A total of 484 artefacts were found in the burial area (of 12 square metres) but no formal tools are present. The 99 square metres of the main site contained 9519 flaked stone tools and a further 333 manuports and river pebbles (Table 1). There are five (5) formal artefacts; two segments, two miscellaneous retouch pieces and one miscellaneous backed piece (Fig. 3) and their location with respect to the hearths appears to be quite random (see Miller & Webley 1994: Fig. 3). Formal tools amount to 0,05% of the lithic assemblage. Two utilised flakes, three grindstone fragments and two flaked hammerstones were also recovered. A single large lower grindstone was plotted (Fig. 2) but not collected and a number of round, quartzite river cobbles, one heavily coated with red ochre, were found on the outer margins of artefact collection.

Table 1: Stone artefact frequencies and raw material from the main site of Jakkalsberg A.

	Quartz	%	Quartzite	%	Other	%	Total
Chips	5933	80,1	1144	56,8	40	9,3	7118
Chunks	110	4,5	138	6,8	37	6,3	285
Flakes	756	10,2	627	31,1	40	9,1	1423
Bladelets	7	0,1	-	0,1	-		9
Cores	578	7,8	91	4,5	-		669
River stones	-		-		200	45,6	200
Manuports	5	0,1	40	0,5	117	26,7	132
Ochre	-		-		3	0,6	3
Total Waste	7389		2012		438		9839
Utilised Flakes	1	100,0	-	25,0	-		2
Grindstone fragments	-		-	50,0	-	50,0	3
Hammer-stone fragments	-		1	25,0	1	50,0	2
Total Utilized	1		4		-		7
Backed flake	-	25,0	-		-		1
Segment	-	40,0	-		-		2
MRP	2	40,0	-		-		2
Total formal	5		-		-		5
Grand Total	7395	75,0	2016	20,5	440	4,5	9851

Stone artefacts consisted mainly of chips (75% of the total assemblage) and the greatest concentration of chips lies to the east of the existing hearths (Fig. 4). There are at least 96 artefacts per square unit from the surface area. One unusual artefact collected outside the gridded area by helpers during the first two day 'rescue dig' is that of a gun-flint of chalcedony or flint (Fig 3:6). It has characteristic bifacial crushing along its edges and microscopic examination of these margins confirms the presence of rust (Binneman, pers. comm.).

The stone artefact assemblage from the sub-surface unit consisted of 573 flaked pieces, and 31 river pebbles (Table 2). Only one formal stone tool, a segment, was recovered from this collection (0,1%), and no utilised pieces were found. The artefact density is highest on the surface while the sub-surface unit contains only 14 artefacts per square unit or 6,4 artefacts per bucket. This suggests that there has been some recent deflation of the intervening soil matrix.

With regard to the raw material, approximately 20% of the artefacts from the A site were on quartzite, the remainder being on quartz. Some 200 chalcedony or agate pebbles were recovered on the site, their function remains unclear as they clearly originated from the river but none had been flaked. Raw material frequencies from the burial area, which is slightly removed from the main concentration of occupational debris, resembles that of the sub-surface unit at Jakkalsberg A. Quartz comprised 51% of the artefacts, 39% were of quartzite and 9% consisted of silcrete, chalcedony, shale and granite.

The B site

No formal tools were recovered from this site (Table 3). Only MOU2 contained utilised pieces, in this case two upper grindstone flakes. The surface unit contained 2583 artefacts, excluding lithic manuports and ochre, which amounts to 22 artefacts per bucket. The densities for the other units are: 4,5 artefacts per bucket for

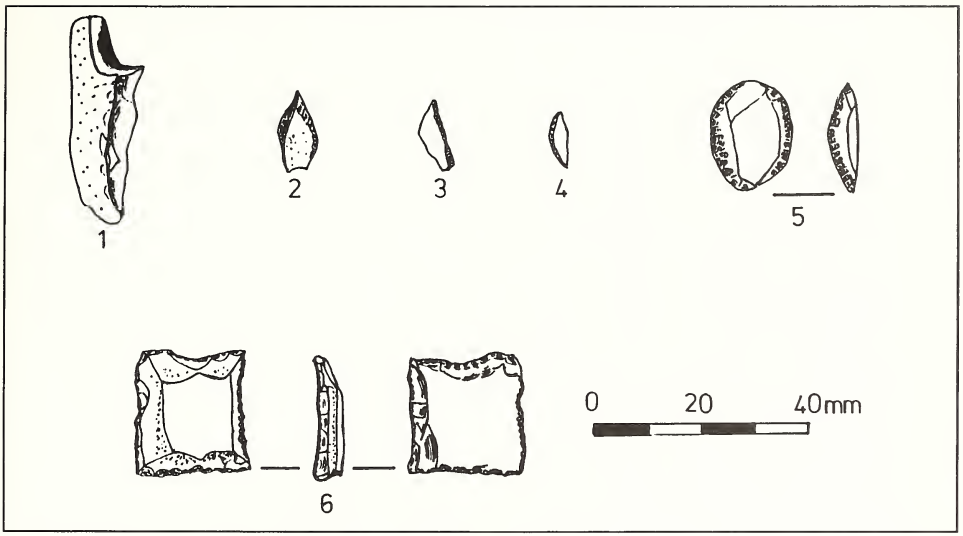

Fig. 3. Stone artefacts from Jakkalsberg A: 1 - quartzite cortical flake from Q37 S; 2 - quartz miscellaneous retouch piece from K37 S; 3 - quartz backed flake from P28 S; 4 - quartz segment from J26 S; 5 - chalcedony scraper from the surface collection along the outer margin of the site; 6 - flint/chalcedony gun-flint found along the outer margin of the site.

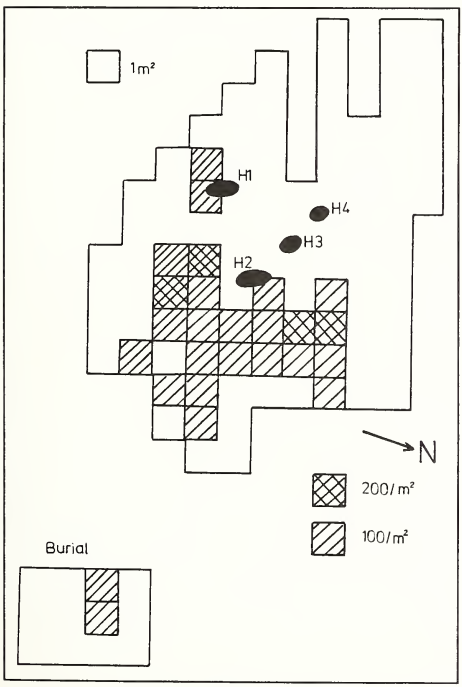

Fig. 4. The spatial distribution of quartz chips at Jakkalsberg A.

MOU, 5 artefacts per bucket for MOU2, 3 artefacts per buckets for MOU3 and 1,5 artefacts per bucket for MOU4.

Approximately two-thirds of the artefacts were manufactured on quartz, the other third on quartzite (Table 4). The source of the quartz is not obvious but the quartzite clearly derives from river cobbles. Small percentages of other raw materials were also recovered such as silcretes, granites, and shales. At least four of the shale pieces resemble palettes, one fragment containing ochre staining. Jakkalsberg B, like the A site, contained large numbers of small, unflaked river pebbles. Furthermore a few quartz crystals and crystal flakes were observed at the B site but not at the A site.

Ochre

Ochre fragments from the A site are quite scarce, with only three tiny pieces being recovered. Ochre staining was also observed: on the skull fragments from the burial; in the aperture of a single ostrich eggshell bead; on one animal bone; a bone peg and one *Unio caffer* fragment. In addition three lumps of white clay were recovered from square M33, heavily coated with red ochre. The *Amalda obtusa* shell recovered from the sub-surface unit also contained red ochre inside its apex.

Jakkalsberg B is distinguished from the A site by the abundance of ochre found in the deposit and adhering to the artefacts and bone. A 1,248 kg lump of fine-grained, powdery red ochre was found immediately outside the collection area (Fig. 2). Sixteen ochre fragments were found in the collection area (Table 4) but the majority are very small, less than one centimetre in size, and red.

Table 2: Stone artefact frequencies and raw material from the sub-surface unit at Jakkalsberg A.

	Quartz	%	Quartzite	%	Other	%	Total
Chips	192	62,3	112	46,8	-	1,8	305
Chunks	15	4,8	21	8,7	2	3,5	38
Flakes	51	16,5	92	38,5	15	26,8	158
Bladelets	1	0,3	-		-		1
Cores	49	15,9	11	4,6	1	1,8	61
Manuports	-		3	1,3	-	8,9	:
River pebbles	-		-		31	55,3	31
Ochre	-		-		1	1,8	-
Total Waste	308		239		56		603
Total Utilized	-		-		-		-
Total Formal	1	-	-		1		-
Grand Total	309	51,1	239	39,5	56	9,3	604

Table 3. Jakkalsberg B: Lithic artefact inventory.

	Surface	%	MOU	%	MOU2	%	MOU3	%	MOU4	%
Chips	1520	57,0	148	48,6	113	52,5	54	54,0	10	35,7
Chunks	130	4,8	11	3,6	10	4,6	3	3,0	3	10,7
Flakes	646	24,2	85	27,9	43	20,0	22	22,0	9	32,1
Bladelets	6	0,2	2	0,6	1	0,4	-	-	-	-
Cores	276	10,3	28	9,2	22	10,2	21	21,0	-	17,8
Manuports	64	2,4	25	8,2	17	7,9	-	-	-	3,5
Ochre	16	0,6	5	1,6	8	3,7	-	-	-	-
Q. Crystals Flaked	5	0,2	-	-	1	0,1	5	-	-	-
Total Waste	2663		304		215		100		28	
U.G. flakes	-	-	-	-	2	100,0	5	-	-	-
Total Utilized	1		-		2		-		-	
Total Formal	-		-		2		-		-	
Grand Total	2663		304		217		100		28	

* U.G. refers to Upper Grindstone

Only one fragment of yellow ochre was recovered. There is evidence to show that ochre was probably transported in ostrich eggshells and tortoise shells. Numerous fragments of ostrich eggshell were coated on their inner surface with red ochre. Furthermore, three tortoise carapace pieces were found in one square and a further eight in an adjoining square, at least half of which were thickly coated within with red ochre. The edges of the

Table 4. Jakkalsberg B: Lithic raw material inventory.

	Surface	%	MOU	%	MOU2	%	MOU3	%	MOU4	%
Quartz	1612	60,5	191	62,8	140	64,5	88	88,0	23	82,1
Quartzite	925	34,7	72	23,7	50	23,0	11	11,0	3	10,7
Sil./Chal.	3	0,1	1	0,3	1	-	-	-	-	-
Granite	5	0,2	6	1,9	1	-	-	-	-	-
Shale	6	0,2	-	0,9	1	0,5	1	1,0	-	-
Ochre	16	0,6	5	1,6	8	3,7	-	-	-	-
//khom	1	0,0	1	0,3	1	-	-	-	-	-
Other	26	1,0	-	-	1	-	-	-	2	7,1
River pebbles	64	2,4	25	8,2	17	7,8	-	-	-	-
Quartz crystal	5	0,2	-	-	1	0,5	-	-	-	-
Total	2663		304		217		100		28	

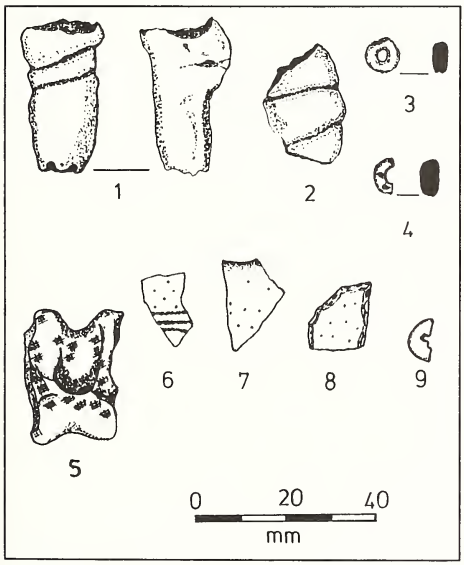

Fig. 5. Small finds from site B. 1 - ochre plug from J13 MOU; 2 - broken ochre plug from J13 MOU with string impressions clearly visible; 3 - ochre bead from I14 MOU; 4 - broken ochre bead from K12 MOU3; 5 - an *astralagus* from J12 S with hatching indicating red ochre; 6 - decorated OES from G15 S; 7 - an OES flask mouth from I11 S; 8 - an OES 'scraper' from G13 S; 9 - a broken *Unio* sp. button or pendant from H11 S.

tortoise carapace were not sufficiently rounded to suggest that they had been modified for use as a bowl, nevertheless they clearly functioned as some type of receptacle.

Many ostrich eggshell beads contained red ochre in their apertures, and interestingly many of the unfinished beads were also coated in ochre.

Red ochre was also combined with some bonding agent (possibly fat or tree resin) and one and a half red ochre beads were recovered (Fig. 5:3,4). They are very fragile and their preservation probably entirely due to the fact that they were buried. These beads differ from those found at other archaeological sites (frequently found strung on a necklace between ostrich eggshell beads - i.e. spacers) in being fairly large. Two unusual red ochre 'plugs' were recovered in a single square (Fig. 5:1,2), they too appear to have been manufactured of a combination of powdered ochre and some bonding agent. Flecks of white observed in one of the plugs suggests that the powdered ochre was combined with ash as well. The complete 'plug' shows signs of string impressions, suggesting that it was used to plug an object of fibrous origin, rather than hard objects such as an ostrich eggshell flask.

One *astralagus* and numerous bone splinters were found coated in red ochre. The splinters do not appear to have been used and the function of the red ochre is not known. Many of the shiny shale pieces recovered during excavations were found to be coated in red ochre. With respect to stone artefacts with red ochre coatings, two upper grindstone flakes of quartzite were found covered with red ochre. Ochre was also found on a number of flaked stone artefacts.

Pottery

The A site

Potsherd densities are fairly high, with the largest number of sherds recovered from one square metre being 55; 37 squares out of the 99 sampled contained 10 or more sherds. A great many fragments were found

Table 5: Potsherd frequencies from the burial, main site and sub-surface unit at Jakkalsberg A.

	Number	< 10 cm	Rims	Decorated Rims	Decorated pieces	Lugs	Mean thickness
Burial	12	1	1	-	-	-	5,9 mm
Main site	845	574	30	10	31	5	5,7 mm
Sub-surface	120	46	6	2	5	1/2	6,0 mm

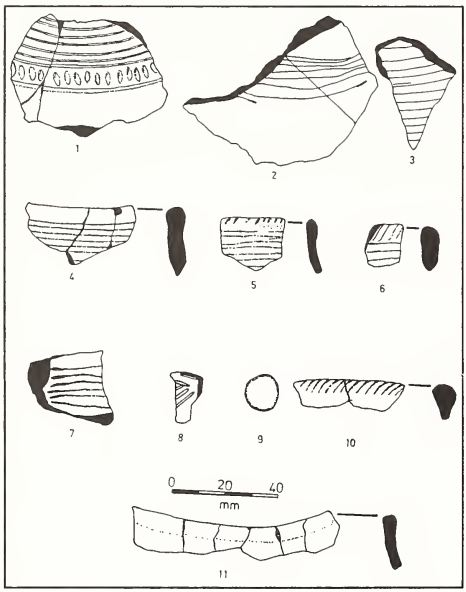

Fig. 6. Decorated potsherds and rims from Jakkalsberg A. 1 - J31 SS; 2 - G32 S & H32 S; 3 - G29 S; 4 - L32 S & M34 S; 5 - O33 S; 6 - O28 S; 7 - I34 SS; 8 - N30 S; 9 - P36 S; 10 - I34 S and surface collection; 11 - L34 S, L35 S, K34 S and K35 S joining to form a neck with a diameter of at least 90 mm.

measuring less than 1 cm in maximum dimension and these were not included in the final potsherd totals (Table 5). In addition to the systematic surface collection of potsherds, the local herdsman and his daughter also collected pottery and donated this to the warden of the Richtersveld National Park. This sample numbers some 680 sherds, but because the exact provenance of these sherds is not known, their analysis has not been incorporated with results discussed below and in Table 5.

The sherd thicknesses were measured and a mean of 5,7 mm was obtained. Some 68% of the sherds measured fell in the range 4,5 mm to 6,4 mm with only a few sherds measuring less than 4,5 mm or more than 7,5 mm in maximum thickness. The mean thickness for the pottery from the sub-surface unit amounted to 6 mm and for the burial area, with its 12 potsherds, 5,9 mm.

No obvious bases or spouts were recovered from site A. It proved difficult to reconstruct ceramic vessels because of the small size of the sherds. However, visual inspection suggests that many fragments were from the same vessels. Some success was achieved with six rim sherds which produced a rim with a diameter of 90 mm (Fig. 6:11). This particular vessel was thin-walled with a red outer burnish. A conservative estimate suggests at least 10 pots are represented on the A site.

Only 41 out of the total of 922 potsherds are decorated which amounts to 4,4%. The most common decoration is incised, horizontal lines; they appear on 26 of the 31 decorated sherds (Table 5). Circular punctate impressions are comparatively rare with only two sherds recorded with this motif. Two sherds contain incised, converging lines. Some 25% of pottery rims are decorated. The majority of rims are either rounded or flat. At least four out of the ten decorated rims contained incised diagonal lines on the lip, *e.g.* Figure 6:5,6,10. One sherd with a combination of incised lines and punctates was recovered in the sub-surface unit (Fig. 6:1). Five lugs were recovered while the herder's daughter collected another. Several sherds had been artificially rounded as if they were being prepared for pendants.

There appears to be an inverse relationship between stone artefact and potsherd densities, with potsherds (especially decorated ones) concentrated in the west of the collection area and stone concentrated to the east. However, it is important to note that the random collection of 680 potsherds discussed above represents 41% of the total potsherd sample from the site. This large collection, if mapped *in situ*, may have significantly altered the spatial patterning of potsherds. Furthermore, the large collection of unprovenanced material makes calculation of ceramic densities, either per cubic metre (Smith *et al.* 1991), or as the pottery index (P.I.) suggested by Yates & Smith (1993) extremely problematic.

Table 6. Jakkalsberg B pottery frequencies, rims decorated pieces, spouts and bosses.

	Number	< 10 cm	Rims	Decorated Rims	Decorated pieces	Bosses/spouts	Mean thickness
Surface	425	215	12	14	51	2,5 bosses, 1 spout	5,2 mm
MOU	26	-	-	-	4	-	5,4 mm
MOU2	27	-	1	-	-	-	4,9 mm
MOU3	4	-	-	-	-	-	5,3 mm
MOU4	3	3	-	-	-	-	4,1 mm

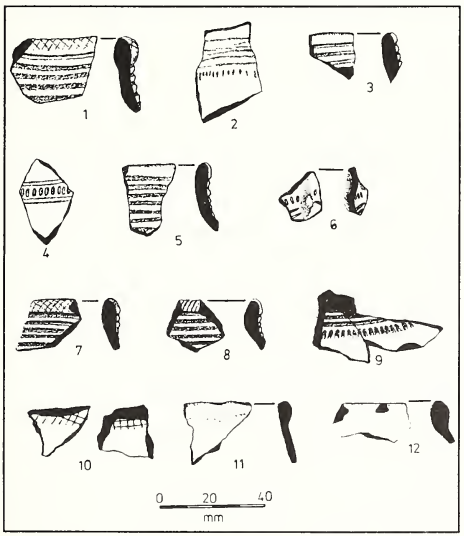

Fig. 7. Decorated potsherds and rims from site B. 1 - surface; 2 - G15 S; 3 - I13 S; 4 - G12 S; 5 - H10 S; 6 -J14 S; 7 - H10 S; 8 - I10 S; 9 - H12 S & F12 S; 10 - H10 & surface; 11 - G10 S; 12 - I14 MOU2.

The B site

A total of 505 potsherds (with a further 102 from the local herder collection) were recovered from the surface of the B site and 65 of these were decorated. This amounts to some 12,8% which is more than the the 4,4% decorated sherds for the A site (Table 6). Mean sherd thickness for the surface unit amounts to 5,2 mm compared to 5,7 mm for the A site. Of the 26 rim sherds, 14 (54%) are decorated. The majority of the rims are rounded although tapered and externally thickened examples also occur. Decorated rimsherds commonly contain diagonal incised lines on the lip and incised horizontal lines on the neck (Fig. 7:8). There are two examples of rimsherds with cross-hatching on the lip (Fig. 7:1,7). Twenty out of the 51 decorated sherds contain horizontal incised lines while the others have punctations or a combination of horizontal lines and punctations, mainly from the neck area (Fig. 8:2). Compared to the A site, punctations at the B site occur more frequently and combinations of parallel lines and punctations are also found.

No lugs were recovered from this site but 2 1/2 bosses (*e.g.* Fig. 9:3) and one spout (Fig. 8:5) suggest that a different type of vessel is represented. Since more of the fragments could be conjoined (*i.e.* Fig. 9:1) it would appear that the artefacts in this area had not been as disturbed and were in better primary context than at the A site. With respect to Figure 9, all the fragments illustrated appear to represent a single vessel and the interesting thing about this vessel is that the decoration seems to cover a fairly large area of the vessel surface rather than being restricted to the neck area. The red ochre adhering to the punctations suggests that it was applied after firing. This vessel varies between 3,5 - 5,5 mm in thickness. Figure 8:1 illustrates the partially reconstructed neck of another vessel with diagonal incisions on the externally thickened lip. The diameter of this neck varies between 70 - 80 mm. The incised lines on the lip also contain red ochre. The temper of this vessel is slightly gritty and the mean thickness of the sherds varies between 4,0 and 5,3 mm. The spout (Fig. 8:5) has a diameter of 30 mm. There would appear to be a greater proportion of potsherds from the B site with red ochre applied to the finished vessel than at the A site. From the decoration and temper, it would appear that a minimum of 8 vessels are represented at the site.

Ostrich Eggshell

The A site

Ostrich eggshell densities were generally fairly low with only a few squares containing more than ten fragments (*i.e.* about 3 g). There is little thus evidence to suggest that ostrich eggs formed an important part of the diet at this site. Densities of ostrich eggshell fragments are low when compared with other open sites along the Orange River such as FR1 (Robertshaw 1979). It would seem that the ostrich eggshells were being used for containers (Fig. 10) and in the manufacture of decorative items such as pendants and beads (Fig. 10). A single ostrich eggshell 'scraper' (Fig. 10) was recovered resembling those from Frummel Bakkies in Bushmanland (Webley 1992). The number of complete, broken and unfinished beads from the grid of 99 square metres of

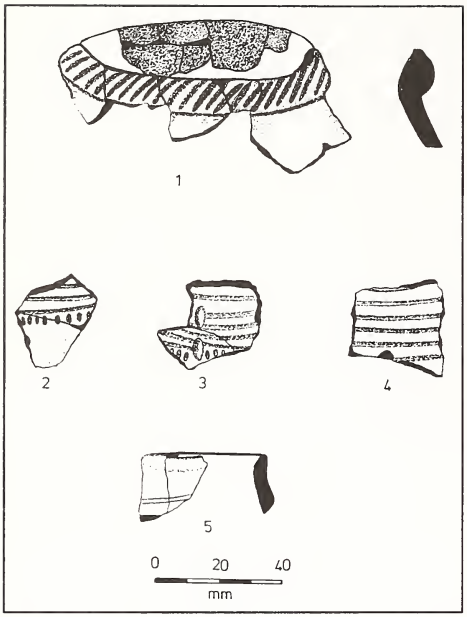

Fig. 8. Decorated pottery from site B. 1 - partially reconstructed rim of a vessel showing decoration consisting of diagonal incisions filled with powdered ochre, the sherds are from I13 S, I12 S, G15 S, G14 S, I13 S, J13 MOU3 and J13 MOU2; 2 - surface and F14 S; 3 - surface and F15 S; 4 - surface; 5 - G13 S, I14 S & J11 S are from a spout.

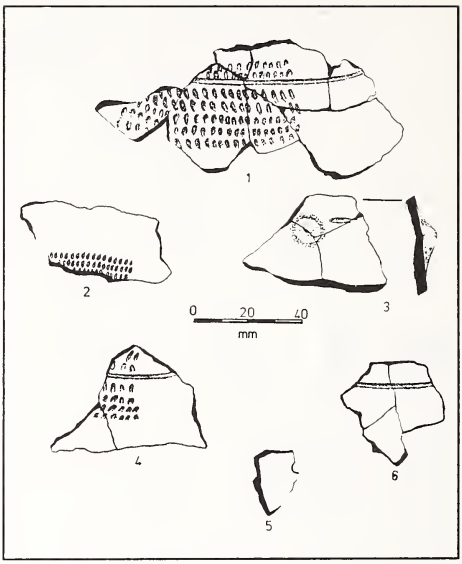

Fig. 9. Decorated sherds from site B. 1 - these sherds are from H14 S, H15 S, G15 S & H14 MOU; 2 - I13 S; 3 - a boss reconstructed from sherds from surface and H14 S; 4 - K12 MOU3 & J12 MOU3; 5 - J12 S contains portion of a drilled hole; 6 - G15 S and H15 S. Many of these sherds appear to belong to the same vessel.

surface material is shown in Table 7. However, one of my assistants during the excavations in November, who lived at a stockpost nearby had made a large collection of beads soon after the site was uncovered. She donated this collection to me and the values for these beads is also given in Table 7. Despite the large number of unfinished beads there were no grooved stones or borers to indicate how the manufacturing process was undertaken on site. Incomplete OES beads were found concentrated in four areas, three close to the hearths, the other overlapping the area of densest stone and bone concentrations.

The external diameters of the complete and broken beads were measured with calipers and a mean of 5,4 mm obtained (Table 7). The distribution of the various size categories is illustrated in Figure 11. The mean diameter measurement for the surface material is 5,4 mm, for the sub-surface sample 5,8 mm and the beads from the burial produced a mean of 5,2 mm (Table 7). However, the discrepancy between the mean of 5,4 mm for the surface unit and 5,8 mm for the sub-surface unit is unlikely, in this case, to relate to changes in bead sizes through time. It is most probably due to the informal collection of ostrich eggshell beads made by the local herdsman and his daughter. The mean external diameter of their collection amounted to 6,4 mm which is considerably higher than the mean for the material collected *in situ*.

It would appear that the herder and his daughter collected the larger beads from the site as their collection includes 28 beads greater than 8,5 mm in external diameter whereas my collection contains only one. When the results of their collection are combined with mine, the mean bead size for the entire Jakkalsberg A surface site is 6,0 mm. When the distribution curve for these new values is plotted, it is clear that while the lower portion of the graph are not substantially affected by the addition of the herder collection, the tail of the curve tends to slope more gently to include a larger percentage of beads greater than 7,5 mm (Fig. 11). Apart from the the fact that 15% of the beads are greater than 7,5 mm in external diameter, at least 2,6% are smaller than 3,5 mm. A total of nine beads, all measuring less than 3,0 mm in external diameter, were found clustered in three adjoining squares which may suggest that they are derived from a single beaded item. Sieves with a mesh size of 1,5 mm was used during the June collections and a 3,0 mm mesh was used in November.

The B site

It is notable that the B site contained significantly larger proportions of ostrich eggshell fragments, the surface unit has some 250 g of OES while the A site site contains only a few fragments of OES per square. A total

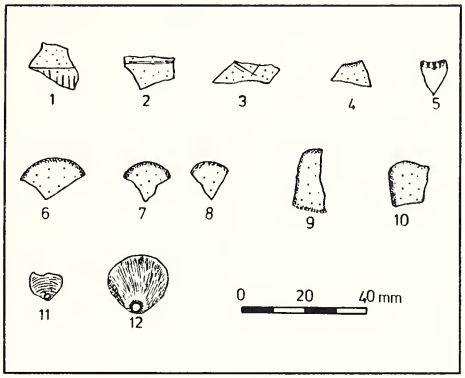

Fig. 10. Ostrich eggshell and marine shell fragments from Jakkalsberg A. 1 - decorated piece from N33 S; 2 - decorated piece from K35 S; 3 - decorated piece from P35 S; 4 - flask mouth from P34 S; 5 - 'scraper' from O30 S; 6 - broken pendant from Q39 S; 7 - broken pendant from J35 S; 8 - broken pendant from H33 S; 9 - rounded OES piece from L38 S; 10 - rounded OES piece from I34 SS; 11 - broken *Corbicula africana* with a hole drilled in the apex; 12 - weathered marine bivalve from N37 S.

of 35 complete ostrich eggshell beads were recovered from the surface of the B site with a mean external diameter of 5,7 mm (Table 8). There were only four broken beads. The most unusual feature of the site however, is the very large number of unfinished eggshell beads, a total of 317. This represents 9 unfinished beads to every one complete bead from the B site, a significantly larger proportion than at the A site where there is only one unfinished bead for every two complete beads. Three squares contained in excess of 20 unfinished beads each. Bead manufacture was clearly of considerable importance at this site although no stone borers or grooved stones were recovered to indicate the method of manufacture. A total of thirteen complete as well as unfinished beads from the surface unit were found covered in red ochre or contained ochre in their apertures.

Marine and freshwater shells

The A site

The most common shell fragments found on site are those of the freshwater mussel, *Unio caffer*, which occurs naturally in quantities in the river. Only 11 hinges of this species were recovered from the site, however, indicating that it could not have formed a significant part of the diet. The presence of a broken shell button and four shell beads (all measuring 4,0 mm in external diameter) suggests that these shells were being collected in order to contains only a few fragments of OES per square. A total of 35 complete ostrich eggshell beads were recovered from the surface of the B site with a mean external diameter measurement of 5,7 mm (Table 8). There were only four broken beads. The most unusual feature of the manufacture decorative items. A number of freshwater bivalve (*Corbicula africana*) fragments were also recovered from the site. One, with a hole drilled in the apex (Fig. 10:11), indicates that their function could also have been decorative. Other marine shells probably

Table 7. Ostrich eggshell beads from the burial, main site, the sub-surface unit and the collection made by the herder at Jakkalsberg A.

	Complete beads	Broken beads	Unfinished beads	Mean bead diameter
Burial	37	3	1	5,2 mm
Main site	84	185	151	5,4 mm
Sub-surface	53	7	13	5,8 mm
Herder collection	201	51	42	6,4 mm

Table 8. Ostrich eggshell bead distributions and bead diameters from Jakkalsberg B.

	Complete beads	Broken Beads	Unfinished beads	Mean bead diameter	Beads with ochre
Surface	35	4	317	5,7 mm	13
MOU	-	4	1	-	-
MOU2	2	4	13	-	2
MOU3	-	-	1	-	-
MOU4	-	-	1	-	-

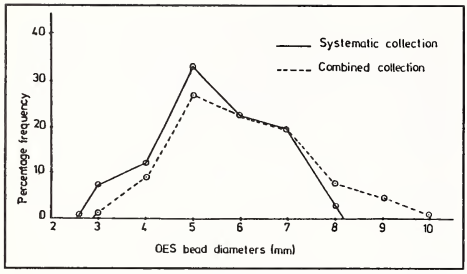

Fig. 11. Jakkalsberg A. Graph indicating the size distribution of ostrich eggshell beads.

introduced for the same reason include two compete shells of the *Marginellidae* family with holes drilled in their apices. These tiny white shells, as well as fragments of two others, were found close together on site. A fragment of a *Cypraea* sp. shell, as well as that of a *Conus* sp, an unidentifiable gastropod, an unidentifiable bivalve, and a fragment of *Haliotis* sp. from the burial area suggest a fairly wide range of marine species. A very worn portion of *Amalda obtusa* with a coating of red ochre in its interior, was recovered from the sub-surface unit. A number of charred fragments of *Patella* sp. were recovered, they appear to be of the *argenvillei* species. This is interesting in view of the large number of *Patella* sp. fragments recovered at the open site of Arrisdrift sampled by Wendt some 30km inland along the Namibian side of the Orange River (Vogel & Visser 1981). One unusual discovery was that of a single, highly polished shark's tooth from square O35 S.

The B site

One small fragment of a cowrie shell (*Cypraea* sp.) was found in G14 S, it was not possible to identify whether it was a warm water species. A small piece of a *Donax serra* bivalve was found, covered in red ochre, in K12 MOU2. Otherwise all the other fragments of shell belonged to *Unio caffra* or *Corbicula africana*. Only three *Unio* sp. hinges were recovered. They were probably used to manufacture decorative items like the *Unio* sp. button found in one square. The *Corbicula* sp. shells, on the other hand, do not contain any suspension holes.

Bone tools

The A site

There is no evidence for an extensive bone industry being practised but sufficient pieces of worked bone in various stages of completion suggest that bone was being worked on site to produce a variety of items. There are no obvious bone points, the majority of polished bone tips are very small (Fig. 12) and could have broken off an awl rather than a point. At least three complete awls were recovered as well as one worked, bone tube. There

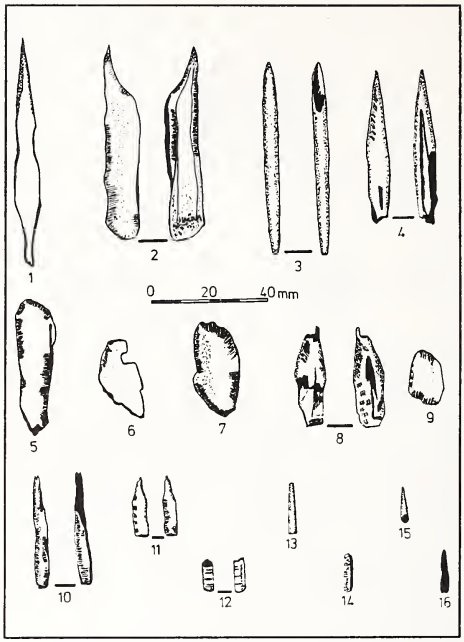

Fig. 12. Worked bone items from site A. 1 - awl from J32 SS; 2 - awl from L35 S; 3 - linkshaft from G31 S; 4 - awl from M33 S; 5 - worked bone flake from N33 S; 6 - L33 S; 7 - worked flake L37 S; 8 - bone peg with hatching indicating the position of ochre from P32 S; 9 - worked bone flake P33 S; 10 - K31 S; 11 - P34 S; 12 - notched worked bone J29 S; 13 - N37 S; 14 - P32 S; 15 - K35 S; 16 - charred bone/wood tip from L31 S.

is also a small fragment of bone with horizontal notching and broken bone peg. The identification of this item as a peg is suggested by its size and shape which resembles wooden pegs used for skinwork among present-day pastoralist groups in Namaqualand (Webley pers. ob.). The peg contains clear patches of red ochre along its base (Fig. 12:8). Finally, there are four worked bone flakes. Although they appear to be incomplete, their shape suggests that they would not have ended up as a bone awl or point. They may well have been intended as bone pendants. The distribution of worked bone items appear to cluster around the hearths and to the western portion of the site.

One decorated bone linkshaft was found in the sub-surface unit. The zigzag pattern running along the length of the implement is interesting as it is not very common to encounter decoration on bone implements (Fig. 13). The decoration may signify ownership.

The B site

There is one complete (Fig. 14:1) and three fragments (Fig. 14:3,6,8) of bone points from this site. Two awls

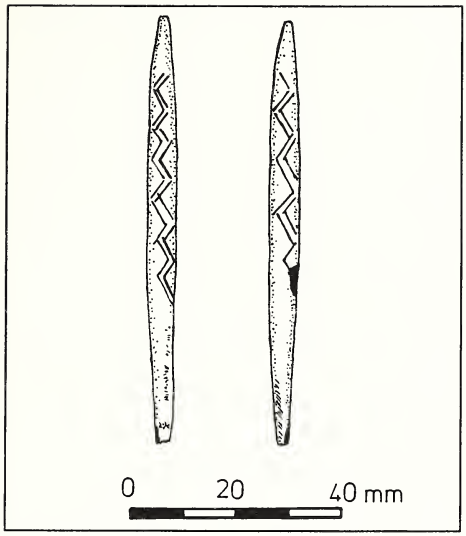

Fig. 13. A bone link-shaft from Blok 1 with zigzag motif along its length.

(Fig. 14:2,5), one broken bone tube (Fig. 14:7) and one bone 'borer' (Fig. 14:4). The point of the latter seems to have been deliberately shaped, perhaps it was used to puncture leather. It is interesting that site B does not contain any of the shaped and worked bone flakes recovered from the A site.

SPATIAL LAYOUT OF THE SITE

A grid was set up over the two sites before surface collection and excavations in order to facilitate spatial analysis. It was recognised that the *in situ* placement of hearths and the distribution of large numbers of stone artefacts, pottery and bone over a wide area meant that Jakkalsberg (A in particular) offered archaeologists the opportunity of recognising activity patterning. Archaeologists concerned with the ceramic L.S.A. have frequently noted that if they want to examine pastoralist patterns, such as the large Khoekhoen encampments described during the 17th century, then they will have to excavate large areas of a site. However, while some 99 square metres were sampled at Jakkalsberg A, this represents only a quarter of the total site. The distribution of stone artefacts, quartz chips, ochre fragments, identifiable bone and worked bone, ostrich eggshell fragments, unfinished and complete beads were all plotted on maps in order to look for patterning. One of the most puzzling features of the spatial layout was the clustering of the four small hearths at the A site - they formed a rough semi-circle a few metres apart. If one considers the modern-day pattern among contemporary pastoralists in Namaqualand, then one would expect the hearths to be at least 10 m apart (Webley 1992). The

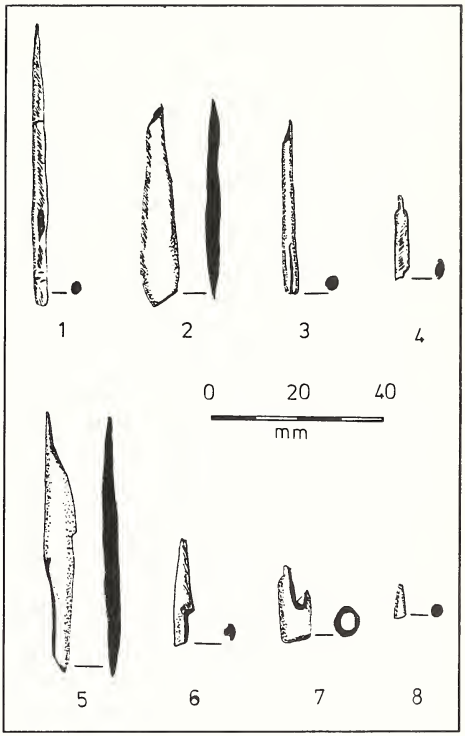

Fig. 14. Worked bone from site B. 1 - a bone point from J13 MOU, the slightly horizontal scoring at the base seems to suggest a position for attachment; 2 - an awl from J15 S; 3 - a broken bone point from H15 S; 4 - a bone 'borer' from I14 S1; 5 - a bone awl from K12 MOU2; 6 - a broken bone point from I12 S; 7 - a broken bone bead from J11 S; 8 - a broken bone tip from G15 S.

distribution of food debris (*i.e.* bone remains) suggests that the consumption or disposal of food took place around and to the east of Hearth 2. High bone concentrations coincide with the greatest concentrations of lithic remains. There are three potsherd concentrations, with the greatest percentage of decorated sherds occurring to the west of Hearth 1. Unfinished ostrich eggshell beads tend to concentrate around the hearths, as do the worked bone fragments. It would appear that the occupants of the site were living in fairly restricted area, although it is possible that a portion of the site has been lost through erosion. Furthermore, it does not appear as if they were living in 'matjies houses'. *i.e.* the spatial layout is not consistent with contemporary settlements.

DISCUSSION

This paper describes the cultural material from excavations at Jakkalsberg A and B. The radiocarbon

dates from the sites (two from each of the A and B sites) confirms that they are in fact broadly contemporary. The sites are unique among open site along the Orange River in that they have excellent preservation of organic material such as bone and charcoal. This appears to be related to the fact that the sites were covered by wind-blown riverine sands soon after they were abandoned, some 1300 years ago. It is not readily apparent, however, why the sites should have remained covered until now. The answer may lie with the several large dead tree trunks observed on the site (Fig. 2). These large trees, which may have grown on the sites during or after their occupation, probably prevented wind erosion in the past.

Subsistence information is discussed in detail in a separate paper (Webley & Brink 1996). Briefly, the small faunal sample is dominated by sheep remains while game was of little importance in the diet. Small numbers of hare and a single equid (the plains zebra) are present. Large numbers of fish remains, the majority still unidentified, indicate that other sources of protein were exploited. The more recent (AD 1750 to 1850) open site of FR1 at the confluence of the Fish River and Orange River sampled by Robertshaw (1979) also contained large numbers of fish bones. His analysis concluded that FR1 was occupied during the mass spawning migration of freshwater fish which occurs at the onset of the rainy season in February or March. The carbonised *Euclea* sp. fruits found in the hearths at both Jakkalsberg A and B suggest an occupation date between December and February (Archer 1994), adding weight to the view that the sites were occupied in summer.

More recently, small-stock herders in the Richtersveld have been reported (Krõhne & Steyn 1990; Mussgnug 1995; Archer pers comm.) to make use of the grazing along the Orange River in summer, when sheep may drink twice a day from the river, while moving to the foothills of the mountains in winter. However, other transhumance patterns have been recorded historically (see Webley 1992). Ethnographic work among descendants of Nama herders in the Leliefontein and Steinkopf Rural Areas (Webley 1986; Webley 1992) indicated that herders generally disperse for part of the year when resources such as grazing and water are plentiful and aggregate when they are scarce. In the Richtersveld, however, stockposts consisting of individual or extended families were probably dispersed along the Orange River during the dry summer months as the vegetation cannot support large numbers of domestic stock for extended periods of time. Winter grazing on the Sandveld and the foothills of the mountains would have allowed larger aggregations.

It is clear from a percussion cap recovered from site B (Miller & Webley 1992) and the gun-flint found along the outer margin of site A, that the area had been visited by mid-nineteenth century travellers/hunters. It is unlikely, in view of the preservation of bone and charcoal, that the sites had been exposed to the elements during these visits. Items dropped by visitors on the surface of the site would have gradually became incorporated with the earlier material due to the action of the wind. While it is possible to explain away the iron fragments found at the A and B site in a similar fashion, one fragment was in fact found *in situ* associated with a small hearth which dated to 1380 ± 50 BP. Furthermore, the metallurgical analysis of small fragments of iron from both the A and B sites suggest (Miller & Webley 1992:91), "that these are no different in composition or structure from numerous examples of indigenous metal working". In addition they have observed, that "there is nothing to distinguish the bulk of this material from iron found at other Early Iron Age sites like Divuyu (Miller 1992) and it may well relate to the associated Jakkalsberg radiocarbon dates of circa AD 690" (Miller & Webley 1992:92). If the iron fragments are accepted as relating to the rest of the assemblage, then the absence of formal stone tools at both sites suggests that iron may well have replaced stone for certain functions. The large assemblage of unretouched stone flakes, however, confirms that stone was still an important raw material.

Stone knapping was clearly being performed at both sites. No formal retouched scrapers were recovered, suggesting that skin-working activities did not take place at the sites or that other artefacts were used instead. Excavations at Spoegrivier Cave, further to the south along the Namaqualand coast, indicates that microlithic scrapers disappear from lithic assemblages with the introduction of pottery. A rough, sandstone scraper (called a *//khom* stone) was recovered from one of the upper units at Spoegrivier Cave (Webley pers. observ.) dating to 1300 BP. Similar *//khom* stones are still used by contemporary Nama-speakers to work animal skins (Webley 1990) but none were securely identified from Jakkalsberg. The absence of adzes is not surprising since they are not common in the L.S.A. of Namaqualand (Webley 1992). The only formal tools which do occur on the A site are segments and miscellaneous retouched and backed pieces. If they were inserts for arrowheads, then the occupants of the sites were remarkably unsuccessful as hunters, as virtually no game remains are represented on the site. The occupants of the sites, but particularly the B site, were grinding up large amounts of red ochre (locally available). This activity, however, is common to both herder and hunter sites.

One of the criteria Smith *et al.* (1991) have proposed for identifying a hunter site is "a high percentage of formal tools," and "a reasonably frequent use of silcrete raw material" (Yates & Smith 1993). A pastoralist site, according to this definition, would display the inverse of this signature. Kasteelberg B, which they take to be their yardstick for a pastoralist site, has a large lithic assemblage but the formal tool component amounts to 0,2% which they contrast with the hunter-gatherer site of Witklip (also in the Western Cape) which has a formal tool component of 4,9%. If one considers the formal tool component of 0,05% from Jakkalsberg A and the complete absence of formal tools from the B site, then according to the criteria designed by Smith *et al.* (1991), the open sites of Jakkalsberg are indeed pastoralist sites.

The decorated linkshaft from the sub-surface unit at the A site is of great interest both because of its scarcity

and because the faunal sample suggests that hunting did not contribute substantially to the diet of the site's inhabitants. It is not unique as a linkshaft or arrow of ivory decorated with zigzags and hatching was discovered on a midden inland from Melkbosch Strand during the 1950s (Rudner 1953). Nevertheless, the decoration does point to some underlying symbolism associated with hunting which is of interest to archaeologists. The absence of bone fish hooks suggests that the fish may have been trapped in fibre nets or baskets. A greater incidence of worked bone was recovered from the A site (with evidence of bone manufacture on site) but no significant observations can be made from the small collections.

A large sample of Later Stone Age pottery was collected from the two sites. The decoration on potsherds from the A site consists almost entirely of parallel, incised lines while those from the B site show a greater incidence of decoration and different decorative motifs (primarily punctate impressions). Lugs are common on the A site while spouts are found on the B site. However, while decoration and vessel shape distinguish these two sites from each other, they share similar sherd thickness and temper. The punctate decoration distinctive to the B site is also found at /Ai tomas further to the south-east (Webley 1992). The shell-edge stamped designs so common at Kasteelberg (Sadr & Smith 1991) were not found at Jakkalsberg although the cross-hatching and diagonal incisions on the rim seem similar. Pastoralist sites, according to the Smith *et al.* (1991) definition, should have high ceramic densities which they measured originally as sherds per cubic metre, but later Yates and Smith (1993) devised a pottery index which is calculated by dividing the number of potsherds by the total number of flaked stone. In Table 1 (Yates & Smith 1993), post-pottery hunters are defined as having a P.I. of less than 1, while the index of post-pottery herders exceed 1. The ceramic index for Jakkalsberg A amounts to 0,09 and even when the 680 sherds collected by the local herdsman is added, the index amounts to 0,14 which is still much lower than the figure for post-pottery herders accepted by Yates & Smith (1993).

Kinahan (1994-5) has observed that small rockshelters dating to the last 2000 years frequently contain a high number of decorated sherds relative to the total ceramic collection suggesting that individual sherds rather than complete pots were introduced to the site, perhaps for ritual reasons. This does not appear to be the case at Jakkalsberg where large numbers of potsherds, clearly relating to individual pots, could be recognised although no sustained effort was made to reconstruct complete vessels.

The mean diameter of ostrich eggshell beads of 6,0 mm from the A site and 5,7 mm from the B site, is similar to bead sizes documented for the period after c. 1600 BP from the Western Cape (Yates 1995). Yates further notes that a diameter of 6,0 mm is only exceeded after c. 1300 BP. Kasteelberg B in the western Cape, which also dates to 1300 BP, has a mean bead diameter of 7,0 mm (Smith *et al.* 1991) which is significantly greater than the mean for Jakkalsberg. The variability in bead sizes observed by Yates (1995) between sites in the Western Cape and Namibia during the period 2000 to 1000 BP may also apply to sites in the Northern Cape. The fact that beads did not increase in size simultaneously throughout Namibia and the north-western Cape suggests a gradual adoption of a pastoralist elements among hunter-gatherers, or alternately a gradual transformation of hunters to the herder way of life, rather than a rapid incursion of herders into the region.

The ochre beads and plugs from the B site hints at a society with a wealth of organic items which have largely disappeared from the archaeological record. The site covers a smaller area than the A site, even when the area under the little hill is taken into account, which suggests that it does not represent a site settled by a group of equivalent size to that which lived at Jakkalsberg A. One explanation may be that site B represents a specialised activity area, reserved for a certain group in society such as the women or a high status individual such as a chief. The large number of unfinished ostrich eggshell beads, the complete lack of formal stone tools and the greater incidence of ground ochre suggests the former to be the more likely (Webley in press).

CONCLUSIONS

The archaeological material from the two contemporary sites of Jakkalsberg A and B suggest that different activities were being performed at these sites. The B site differs from the A site in having larger numbers of ochre fragments, extensive evidence for the manufacture of ostrich eggshell beads on site and a greater number of decorated ceramic vessels displaying different decorative motifs. The A site on the other hand, is much larger and exhibits a greater range of domestic activities. The evidence seems to suggest that Jakkalsberg B represents a specialised activity area, and I have argued elsewhere (Webley in press), that this was a specialised women's area.

Jakkalsberg was occupied at the same time as Kasteelberg B in the Western Cape, i.e. approximately 1300 BP although its ceramics more closely resembles that found at Kasteelberg A (Sadr pers. comm.). If Kasteelberg is taken as the pastoralist 'type site', then how does Jakkalsberg compare? Jakkalsberg is of great significance to archaeologists because of its implications for those concerned with identifying pastoralist sites. Although a number of open sites have been identified along the banks of the lower Orange River (*e.g.* Robertshaw 1979), in the majority of cases bone is not preserved.

The faunal material from Jakkalsberg points unequivocably, I would contend, to a pastoralist occupation. In support of this claim I refer to Smith *et al.* (1991) who explicitly note that sites with a significant numbers of domestic stock in the faunal remains, indicate a herding economy (*ibid*:71). The low percentage of lithic formal tools would appear to be in line with the one of the criteria which they have identified for pastoralism.

However, the ostrich eggshell beads are not quite as large as those of Kasteelberg and the pottery index falls lamentably short. Thus while the economic indicators suggest that inhabitants of Jakkalsberg were pastoralists, at least some items of their material culture (ostrich eggshell beads and ceramic density) differs from the norms established for the south-western Cape.

While Yates and Smith (1993:99) acknowledge that it is unrealistic to expect the cultural signatures of hunters to be "absolutely different" from those of herder in the south-western Cape, their model postulates a one-way exchange of material culture items from herders to hunters rather than *vice versa*. In other words, while the norms for a hunter signature may be expected to vary, those for herders should conform, in the main, to the type site of Kasteelberg. This expectation is reflected in the attempt by Wilson (1996) to determine whether the Late Holocene occupants of Die Kelders cave in the Southern Cape conform to Smith *et al.*' (1991) criteria for a pastoralist site. The results from Jakkalsberg suggests that pastoralist sites, too, may be expected to exhibit variability in their material culture remains.

The presence of a decorated linkshaft and the small number of backed artefacts suggest that the occupants of Jakkalberg did hunt although this is not supported by the fauna from the sites. However, if the sites along the Orange River were only occupied during the summer months as part of a seasonal transhumance pattern which included either the mountains or the sandveld in winter, then it is clearly possible that these winter settlements could contain larger numbers of game. Ethnographic research amongst small-stock herders in the Leliefontein Rural Area (Webley 1986) confirmed that winter and summer settlements would have differed in location, size and structure as well as in the relative percentages of domestic stock. I would concur with Kinahan (1994-5:221) that defining a pastoralist site only on the basis of livestock remains "does not take into account the practical arrangements of herding". The fact that a site contains only small numbers of domestic stock should not automatically preclude the possibility that it could be a pastoralist settlement. In conclusion, the results from Jakkalsberg on the Orange River suggests that while our understanding of the archaeological identity of pastoralist groups has increased significantly due to recent research in the Western Cape and Namibia, the introduction of pastoralism was indeed a complex process and we may expect a great deal more ambiguity as more archaeological sites are excavated and the data published.

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SOCIAL CHANGE AT TWYFELPOORT ROCK SHELTER IN THE EARLY NINETEENTH CENTURY*

CAROL WALLACE

Department of Archaeology, University of the Witwatersrand
Private Bag 3, Wits, 2050

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ABSTRACT

Twyfelpoort rock shelter is situated in the eastern Free State, with sequences indicating contact between San people and new groups in the early nineteenth century. This was a time of political and social upheaval in southern Africa, with large scale migrations and frequent periods of famine and the people living there would have been part of this climate of change and insecurity. Historical accounts frequently ignore Bushmen or portray them as victims or trouble making thieves. Excavations at Twyfelpoort however, suggest that while the people living at Twyfelpoort did experience social and economic stress, they had constructive ways of dealing with changes happening around them as new people moved into the area. They cannot be ignored as people making conscious decisions in response to the changing circumstance around them.

INTRODUCTION

Twyfelpoort is a rock shelter situated in the eastern Free State with sequences indicating contact with both black and white agriculturists during the early nineteenth century. This was a period that saw the whole of southern Africa in political and social upheaval marked by massive migration, sporadic raids and frequent periods of famine (Eldredge 1995). The eastern part of the Free State was no exception to this climate of change and insecurity and it is in this context that the uppermost part of Twyfelpoort rock shelter must be viewed. The people living there at the time would have had to contend with increased competition in terms of resources, as well as negotiate their own place in the changing political and economical environment.

In most historical accounts the San are almost totally ignored, except for a few accounts citing them as thieves. Ransford (1972:4) states that San "would have nothing to do with whites. Their inclination was to withdraw before them into the more inaccessible parts of the interior. Yet their presence was always felt and it was always a malevolent one, for they were quite incapable of resisting the temptation to raid the European pastoralists' stock". Yet these are the people that had been living there for thousands of years, long before any others chose to lay claim to the land. Surely they too must have their place in history. This paper tries to understand the complexity of relationships that influenced the people that lived at Twyfelpoort in the early part of the 19th century.

The uncritical view taken in the classical history texts is that in the eastern Free State, San either retreated into isolated areas or went to war in the form of raids. They are often seen as passive victims of the changes that surrounded them. Historically, Bushmen coming into contact with farming communities have been described as reacting negatively. They are seen to have been overwhelmed, with no control over their changing environment. It is seldom considered that they may have reacted to a changing environment in a way that was advantageous to them. Several recent papers have emphasised the need to understand the active roles that Bushmen played in shaping their history (Jolly 1994, 1996; Dowson 1995).

SAN INTERACTIONS WITH FARMING COMMUNITIES

The first Bantu-speakers to occupy the Caledon valley were the Phetla, a Nguni group who settled in the south-eastern Lesotho. They were later joined by the Polane and the Phuti, two other Nguni groups (Maggs 1976). The Fokeng were the earliest of the Sotho groups to occupy this area after migrating from the central Transvaal. By the end of the 17th century, a relatively stable frontier had been established (Jolly 1994; Maggs 1976). In the early 1920's the effects of the Difaqane first began to be felt in the area when Nguni groups crossed the Drakensberg into areas occupied by the southern Sotho (Wright 1971:16).

Jolly (1994) has characterised the relationships between these new groups of people and the San who had been living in the area. Early relationships appear to have been fairly amicable, with close symbiotic relationships

forming between these groups. As Jolly (1994:73) points out, the potential benefits to pioneering farmers of forming good relationships with San neighbours are often likely to have outweighed any benefits that may have resulted from attempts to subdue these people. Options would have included trade, exchange of labour in the form of clientship and intermarriage.

Interactions would have undoubtedly have changed as a response to the years of turmoil associated with the Difaqane. In many ways, the San had an advantage over their farming neighbours (Jolly 1994:56). They possessed no crops and few if any cattle, and while there must have been a greater competition for the resources available to them, they had a better understanding of those resources than the farmers. While there were some disputes between San and Sotho, relationships on the whole appear to have been fairly good during this time, with San often coming to the aid of refugees in the form of shelter, food and military assistance.

By the 1830's, the area in which Twyfelpoort is situated was at the edge of the Basotho territory ruled by Moshesh (Orpen 1955; Smith 1975). In June 1833, missionaries Casalis, Arcousset and Gosselim came to settle with Moshesh at Morija (Casalis 1861; Orpen 1955). Orpen (1955:6) reports that until then, Moshesh had seen only two whites who were assumed to have been "killed, and probably eaten, as they went towards a tribe who were at the time cannibals". Soon after the arrival of Casalis, the Rev Archbell, along with Revs Edward and Alison of the Wesleyan missionary Society set up a mission at Lishuani, some 50 km south of Marquard (Orpen 1955; Smith 1975). The first white trader, Mr Fossey, appeared in the year following the arrival of the French missionaries.

We can assume that the people who lived at Twyfelpoort and the surrounding areas had no direct contact with white people at least until the 1820's, but more likely until the early 1830's. Smith (1975) travelled through the area in late 1834. He reported European settlers, presumable Trekboers at a place called Seven Fonteynes situated on the Lieu or Lion River. Smith reports three Bushman kraals just outside the settlement.

By 1836, the Great Trek was well under way (Lacour-Gayet 1970; Selby 1973). The main routes passed through the area West of the Caledon river valley, including the area where Marquard is now situated. Orpen reports that in the latter part of 1836, "the great immigration of the Boers took place, most of them stayed for some time..." (Orpen 1955:10). Although Moshesh never actually granted them any land, he did allow them to stay for a year or so, "that they might rest on their journey" (Orpen 1955:11). Many of them took up temporary residence in the Caledon district, and by the end of 1937, they had mostly passed on to Natal.

There are several options available to hunter-gatherers after contact with new settlers in a region (Alexander 1984:15). First, they can retire into isolation and continue existing in areas not utilised by farmers. Second, this can result in the destruction and dispersal of communities into previously marginal land. Third, they can establish symbiotic relationships with farming communities, sometimes leading to clientship. Finally, they have the option of going to war with the farmers. Twyfelpoort shelter is easily accessible and there is no archaeological evidence to show that the people living at Twyfelpoort had retreated into isolation. Evidence from the site suggests that there is a 2000 year hiatus between the last occupation of Later Stone Age people and occupation in the early nineteenth century. This reoccupation of the shelter may indicate a greater competition for resources as a result of the Difaqane when many farming communities were forced to subsist by hunting and gathering and to occupy rock shelters (Jolly 1994). Changing relationships with neighbouring farmers would have impacted on the San in many ways. There may have been physical stress as a result of increased competition for resources, but there would also have been social, economic and political repercussions.

MODELS OF STRESS

Hunter-gatherers have developed various mechanisms to deal with stress. These mechanisms involve both positive and negative reactions. Dirks (1980) found that humans react to stress in the from of famine and severe food shortages in a fairly predictable manner. The initial stage of famine or perceived food shortage results in alarm. During this early stage, stress can have a positive consequence. There is usually an increase in activity and reciprocity. There is a tightening of social rules, often accompanied by an increase in ritual. All in all, individuals attempt some sort of control over their environment. These reactions characterise either a short period of stress, stress at local level, or the early phase of a prolonged period of environmental stress.

If the situation continues to worsen, an increase in energy deficit results in a decrease in activity. Social ties erode and there is a decrease in reciprocity. This is almost a mechanism to conserve energy. The state characterised by resistance can be expected when the stress is fairly long term and regional as opposed to local. Finally, when exhaustion sets in, there is a general collapse of the social structure. Reciprocity almost ceases and eventually constricts to a point at which the family ceases to function as a redistributive, protective entity and individuals begin to fend for themselves. Exhaustion occurs where the stress is long term and at a regional rather than a local level.

While Dirk's model describes a social reaction to what is essentially a physical phenomenon, it is important to understand that stress can be psychological, political, economic or social. These realms are interrelated, and changes in one are bound to result in changes in the others. In the case of famine, physical or environmental stress and social stress cannot be separated from one another. Indeed, famine is less of a problem of food shortage than one of food production and food sharing or distribution (Copans 1980). It is difficult to define food shortage without understanding the various stratifications and distributions of power within a society. In other

words, stress arises out of social circumstances rather than simply physical or environmental ones.

MECHANISMS OF COPING WITH STRESS

All societies have developed mechanisms to deal with stress. In San societies, scarcity places a strain on relations and tensions are resolved through increased ritual and a formalisation of relations. Reciprocity is also witnessed in the from of gift exchange which can play a vital part in times of social or economic stress (Wadley 1987:76). Strengthening reciprocal ties with neighbours provides some kind of insurance against risk (Cashdan 1985).

The use of reciprocity as a form of insurance against risk can be linked to territoriality. Cashdan (1983) found that the degree of territoriality displayed by foraging groups depends to a large extent on the type of environmental stress experienced and whether or not it occurs at a local or regional level. If the stress is local, people have the option of moving into neighbouring territories, and mechanisms such as gift exchange can facilitate this. Thus, where local scarcity can be compensated by regional abundance gift exchange plays an important part in maintaining social ties with neighbours as a means of risk insurance (Wadley 1987:77). However, among groups living in areas where resources are scarce and unpredictable and where the effect is regional rather than local, this mechanism for coping no longer works. Territoriality tends to become more emphasised and territorial mechanisms of social exclusion come into play as means of coping with risk (Cashdan 1983:5).

To sum up, there are various mechanisms that societies use to cope with stress. During the initial stage, these responses are characterised by an increase in reciprocity, a tightening of social rules and often an increase in ritual. The usefulness of reciprocity as a means of coping with risk would depend on the type of stress experienced, in other words whether it was regional or local, short-term or extended. The tightening of social rules and the use of ritual could be expected no matter whether the stress is local or regional, since these mechanisms do not depend on conditions in neighbouring areas. These are mechanisms that are situated within the group rather than outside it.

RECOGNISING STRESS IN THE ARCHAEOLOGICAL RECORD

Since stress affects all aspects of social life, including reciprocity and territoriality, it must have a significant effect on material culture. An increase in territoriality indicates increasing concern with group identity. In terms of material culture, variations in patterning are related to changes in the degree of conflict and competition over resources and the resulting need to stress overly clear, unambiguous identities (Hodder 1979:447). Style is a useful form of transmitting information about both personal and group identity (Weisner 1983:56).

Weissner (1983) identifies two types of style; assertive and emblemic. Assertive is a formal variation in material culture which is personally based and which carries information supporting individual identity. Emblemic style on the other hand style refers to formal variation in material culture that carries information about the existence of groups and boundaries. Emblemic style can be distinguished archaeologically by uniformity within its realm of function.

Hodder (1979) emphasises the importance of material culture to social relationships, especially when they are under strain. When tension exists between two groups, style or specific artefacts can be used as part of the expression of within-group corporateness in reference to outsiders. At the same time, as distinctions between ethnic groups decrease, for whatever reason, variability within the material culture associated with individuals may be greater. Thus, when tension between groups exists and they wish to emphasise territoriality, we can expect an emphasis on emblemic style and less variation in the material culture within each group. There is an emphasis on group identity. On the other hand, in groups that are no longer concerned with stressing group identity, there is a greater emphasis on assertive style, and we can expect to see a greater variation in the material culture.

RESULTS OF EXCAVATIONS AT TWYFELPOORT

The details of the excavation of Twyfelpoort shelter are discussed in detail elsewhere (Backwell *et al.* 1996) and will only be briefly summarised here. Since this paper deals with the site during periods of contact, I will focus on the upper levels. These are the P, C, M and H levels. Level L underlies H and is dated 1880 ± 50 BP (Pta-6171). Level H is followed by C and finally P, the youngest layer. Level M is very similar to C, but while it is older than H, we are uncertain as to it's relationship with H, C and P.

The lithic assemblage from Twyfelpoort can be classified as post-classic Wilton. In general, the frequency of formal tools in the H level is fairly high compared to the earlier L level. The level drops off in the C and is at its lowest in the P. This trend is especially true of small scrapers. A similar trend is followed by the blades, spokeshaves and adzes.

Worked bone and ostrich eggshell are most abundant in the L, less common in the H level, and almost absent from the youngest levels.

The H, M, C and P levels all contain pieces of pottery. Only one fragment from the P level had a decorated rim indicating a Type V industry (Maggs 1976). Other evidence of contact with farmers include unidentified metal pieces, glass beads and an *Ovis* (sheep) bone from the H level.

The H, M, C and P levels all contain large quantities of fragmented peach pips. The presence of peach pips has been taken to represent either direct or indirect contact with Europeans. The early missionaries that settled in the

area began to plant fruit trees and to develop the orchards that would become a feature of their stations soon after they arrived (Germond 1967). Thus the peach pips probably date to around 1833. Of course local people may have been growing peaches ahead of the arrival of the missionaries, but it is unlikely that the pips date to much earlier than the 1820's. Interestingly, barter exchange of foodstuffs is almost unheard of between hunter-gatherers (Moore 1985). The presence of peach pips gives us greater insight into the changing mechanisms that people at Twyfelpoort developed to cope with the changes surrounding them.

UNDERSTANDING INTERACTION AT TWYFELPOORT ROCK SHELTER

At Twyfelpoort, there are several possible indicators of change in the society due to interaction between hunter gatherers and farmers. Since stone tools have the capacity to reflect degrees of formal behaviour and an increasing emphasis of emblemic style, changes in the lithic assemblage need consideration. Notably, there is a significant increase in the number of formal tools in the H level, and compared with earlier levels. The H level contains the highest frequency of small end scrapers, signifying greater standardisation than was present before.

As archaeologists, we classify tools in terms of informal or formal. This does not however necessarily reflect a difference in the functions of these tools. Harper (1994) has found that use-wear on blades and flake-blades is similar. Tools classed as "formal" are not different from those classed as "informal" purely in terms of function. They have the capacity to emphasis style, and their value may well be social rather than functional. Hodder (1987) argues that an increase in standardisation and formalisation are an indicator of stress. The lithic assemblage found in the H level may indicate an increasing concern with emblemic, rather than assertive style. This signifies a greater concern with territoriality and group identity. It is also an indication of the tightening of social rules. Wadley (1987:42) argues that standardised morphology is a reflection of formal behaviour.

In the H level, there is a decrease in the number of potential gift items such as ostrich eggshell and bone bead and there is no evidence of the type of reciprocity which is to be expected if the stress the occupants were experiencing was on a regional rather than a local level. Gift exchange is only effective as form of insurance when the partners have the option of moving in with neighbours during times of stress. If the stress occurs at a regional level, this option is not longer available, and reciprocity becomes redundant (Cashdan 1985).

There are several lines of evidence that point to an increase in ritual in the H and C level. First, both levels contain MSA tools and antique pieces. These may have been recognised for their great antiquity and link to the past, and may have formed part of the shaman's paraphernalia (Wadley 1987:44). The C level also contains a quartz crystal, an object which can be linked to shamanism and ritual. There is an increase in the amount of ochre found in the C level which may also indicate an increasing concern with ritual and shamanism expressed in rock art. Shamans in San societies enter into a trance for a variety of reasons; curing, predicting the future, ensuring good hunting and rainmaking. Trance is also used as a mechanism for resolving conflict (Lee 1979). Most, if not all rock art has been unequivocally associated with trance belief and experience and the art is actively implicated in the reproduction and transformation of social relations (Dowson 1995). In a time characterised by changing social relations and often conflict, rock art and the rituals associated with it would be an important mechanism for resolving stress. There is evidence to suggest that San rock art depicting domestic ungulates was an attempt to regulate changing relations within their own society rather than regulating San relation with farming neighbours (Loubser & Laurens 1994).

There appear to be several indicators pointing to a positive reaction by the San to the initial stages of stress. There is a tightening of social relations as well as an increasing concern with ritual. There is also a greater emphasis on territoriality and group identity. Although the above evidence indicates stress, it does not signify the type of stress experienced, nor its extent.

Faunal remains can be an important indicator of stress. Cohen argues that an increase in population pressure could result in the exploitation of previously ignored micro-niches (Cohen 1975:473). An increase in competition could also result in a change in animals hunted, as could a decrease in mobility. Interestingly, the faunal remains do not indicate a meaningful change in the hunting strategies of the people occupying the H level. Other than a general decrease in the amount of bone present, there is almost no difference in the procurement strategies of the people who occupied the shelter during the L level almost two thousand years ago, and those that occupied it during the last century. The fact the animals were still hunted as well as snared seems to signify that there was no significant restriction in the mobility of the people living at Twyfelpoort.

It would seem then, that any stress experienced was not the result of scarcity or restricted mobility. I argue that the stress was social in origin. In the 1820's and 1830's, the Bushmen living at Twyfelpoort had to contend with many changes. The social disruptions caused by the Difaqane resulted in many new groups moving into the area. Along with the influx of new people came changing alliances and new conflicts. The arrival of whites, first in the form of missionaries, and later in the form of early trekers also had far reaching consequences. No-one living in the Caledon district could have been untouched by these changes. I argue that the San living there during the H levels responded to the stress caused by this uncertainty by tightening their social relationships and emphasising their own group identity. Ritual was used as a means of reinforcing those relationships.

The development of these new relationships may have been mutually beneficial. The fact that there is no significant change in subsistence strategies could indicate good relations that allowed continued access to resources as well as maintained mobility. It would seem as if the hunter-gatherers reacted positively to stress by forming mutually beneficial symbiotic relations with the farmers, maybe leading to some form of client ship.

The C level has evidence for a greater amount of stress. The lack of identifiable bone could indicate an increase in marrow extraction it could also be that fewer animals were hunted, signifying a decrease in mobility. Cores and unretouched blades and flakes reach their peak in this level, indicating more expedient manufacture of tools than previously. Nevertheless, the frequency of formal tools is still high and the people may still be concerned with group relations and group identity. This evidence is supported by the number of artefacts associated with ritual. What we may be seeing in this level is the beginning of more strained relations between the San and the neighbouring farmers. This could be an indication of resistance; physical stress is starting to increase and the continuing concern with ritual and identity may be a means of coping with both scarcity and strained relations.

The P level has the lowest frequency of both formal and informal tools, as well as items for gift exchange. Given the fact that San society as a cultural entity in the area did become extinct, it is entirely possible that the people occupying the P level at Twyfelpoort had entered Dirk's stage of resistance or even collapse. But there are other possibilities. One possible explanation is that the occupation was ephemeral. While this could be the result of fewer people living in the area, it could also be that they were living somewhere else. Houses could have been built close to their employers. Smith reports three San kraals outside of the settlement of Seven Fonteyns in 1934. The inhabitants of these kraals were described as "visiting Seven Fonteyns occasionally for the twofold purpose, first of showing that they were friendly and second, of begging a little food or tobacco" (Smith 1975:46). But it would also make sense for San working for white farmers to live near their employers.

Thus, while the artefacts in the P level could signify an increasingly negative reaction to stress that characterises the collapse of a society, they could also indicate continued incorporation and assimilation into a different society. Clientship was not the only option available to them. Many may have intermarried with either blacks or whites, or become concubines, and their children may have become assimilated into those communities. History has long held that the San of southern Africa became extinct in most areas as a result of their inability to cope with social change and their continued persecution by the farmers they came into contact with. Certainly not all relationships were good, and writers at the time often describe the San as menaces. But researchers are beginning to realise that these people cannot be regarded as simply passive or helpless.

Increasingly, evidence shows that the San cannot be ignored as people making conscious decisions in response to the changing circumstances around them. Hunter-gatherers coped with the introduction of farming communities by establishing new types of social relationships with them. For instance, exchange relationships with early farmers were based on barter in contrast to the reciprocal nature of exchange arrangements between hunter-gatherers (Thorp 1996). The San also had control over the degree of interaction with new-comers. Their decisions did include resistance and warfare, but they also included clientship and intermarriage. Initially, at least, hunter-gatherers probably had a lot to teach the immigrants, both black and white, and they may well have engaged in mutually beneficial relations. This seems to be the case during the H level at Twyfelpoort. The people living there did experience stress, but it was the stress of forging new relationships and adjusting to a new presence in the area, not the severe stress associated with the complete dominance and competition that would characterise the area in later years. Far from just being victims to stronger and more advanced powers, San too have their place in our history, making choices and decisions that would shape their destiny.

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ARCHAEOMETALLURGICAL STUDIES IN MARITIME ARCHAEOLOGY AT THE CAPE OF GOOD HOPE*

DUNCAN MILLER

Department of Archaeology,
University of Cape Town,
Rondebosch 7701

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ABSTRACT

Few metal artefacts recovered from maritime archaeological contexts in southern Africa have been subject to metallographic or chemical analysis. This paper presents several case studies to illustrate some of the questions that can be addressed with the analysis of maritime metals and corrosion products.

INTRODUCTION

This paper summarises a series of studies conducted in the Archaeology Materials Laboratory, University of Cape Town, aimed at solving specific problems in the interpretation of metal artefacts recovered from maritime sites near Cape Town.

The first set of samples was from a pair of large bronze cannon recovered on 11 February 1989 by Bruno Werz (University of Cape Town) from the wreck of the Dutch East Indiaman "Oosterland" which foundered in Table Bay on 24 May 1697 (Werz 1992:85,87). These cannon are now housed in the Maritime Museum, Waterfront, Cape Town. These were sampled for compositional analysis to determine the nature of the bronze alloy used in their manufacture. A fragment of corrosion product from the inside of the breech of a bronze swivel gun recovered from the "Oosterland" was also analyzed for comparison. Drill turnings or swarf from an unidentified bronze cannon in the Cape Town Castle were made available by David Halkett (University of Cape Town) for comparison.

The second set of samples consisted of several sheets of copper and what appeared to be corroded examples of similar copper sheeting also recovered from the "Oosterland" by Bruno Werz. These were investigated to attempt to confirm the identification of the corroded material. There were morphological similarities in the shape of the copper sheets and the corroded objects. There were examples of flat copper sheeting, with irregular edges as well as right angle corners. In some instances there were copper rivets and nails still attached to this sheeting. There were also elongated strips of metal, generally about 50 - 100 mm wide, with a sharp fold along one long edge, and a row of more or less equally spaced nail holes along the other. These features were reflected in the corroded specimens, but were largely obscured by the corrosion product. There were sheared sheets, and elongated strips with a curve along one side, and in a few cases indentations that may have represented nail holes like those present in the copper sheet.

The third set of samples studied consisted of three copper bars recovered by Bruno Werz from another Dutch wreck near Cape Town, identified by him as the "Waddinxsveen" (dating to 1697). One of the copper bars was sampled and analyzed metallographically prior to sending it to the British Museum for trace element analysis in an attempt to identify the origin of the copper.

The fourth set of samples consisted of four bronze samples recovered by Jaco Boshoff of the Maritime Museum, Cape Town. These were analyzed to determine the degree of similarity between them, and to try to identify the provenance of one of them which came from a disassociated rudder.

ANALYTICAL METHODS

In the case of the "Oosterland" cannon a single 5 g fragment was removed from one of the eroded handles by careful, water-cooled sawing with a fine hacksaw. This sample was removed under National Monuments Council Permit No. 8/94/02/003/30. Several fragments of corrosion product had been retained from the inside of the barrel of the other cannon prior to cleaning and restoration, and a piece of this was analyzed so as not to damage the intact metal. In the other cases, except for the bronze turnings, small sections were removed with a water-cooled rotary diamond saw. Each sample, including the bronze swarf, was mounted separately in acrylic resin under vacuum to remove air bubbles, and ground and polished on rotary laps, with a final ¼ micron diamond polish.

The polished and subsequently etched sections were

studied with a Reichert-Jung Polyvar dual metallographic/ petrographic microscope, using plane polarised light and Nomarski differential interference contrast where appropriate (Snyman 1989). Grain size was established by visual comparison with standard charts (ASTM 1981). Microhardness was determined with a Shimadzu microhardness tester fitted with a Vickers microhardness indenter, except for some samples tested later with a Knoop indenter because the Vickers indenter on the available instrument was damaged. Knoop microhardness is sensitive to anisotropy, both crystallographic and microstructural, so determinations were made in various orientations on each specimen in order to minimise this effect. Knoop microhardness is not standard for archaeometallurgical purposes but values can be compared approximately with Vickers microhardness values by dividing by 1,087 (Ross 1985:5). The adjusted values are given in square brackets after the measured Knoop microhardness values.

The chemical analyses were carried out in the Electron Microscope Unit, UCT, using the Cambridge S200 and S400 scanning electron microscopes (SEM) with energy dispersive X-ray fluorescence micro-analysis systems (EDS). Analyses were done in raster mode for the determination of bulk compositions and in spot mode, with an analytical volume of about 1 micron diameter, for the determination of composition in selected locations. Software ZAF corrections were applied to the analytical results to produce semi-quantitative elemental analyses expressed as percentages normalised to 100 percent. This system has a precision of about 1 percent for the detectable elements, in this case those with atomic weights heavier than sodium. The lower limit of detection is about 0,1 percent under optimal conditions. This means that values below 1 percent only represent presence or absence information.

DESCRIPTIONS AND ANALYTICAL RESULTS

"Oosterland" bronze cannon specimen

The irregularly shaped 5 g bronze sample measured 16 mm by 7 mm by 6 mm and its removal left a neat, flat surface at the base of the eroded cannon handle selected for sampling and analysis (Figs 1 & 2). Under the reflected light microscope, the polished sample exhibited severe casting porosity and had a large crack partly filled with grey corrosion products (Fig. 3). The metal was a bronze containing approximately 3,4 % tin dissolved in copper (Table 1:Oost3a-c). Etching for 10 seconds in an $FeCl_3$ solution revealed the coarse grain size, greater than ASTM 0, due to very slow cooling of the bulky casting. The metal was single phase, as is to be expected from a low tin bronze (Scott 1991).

There were numerous dual component inclusions which were rounded or globular, predominantly light blue-grey in reflected plane polarised light, with some irregular darker patches (Fig. 4). There were a few less numerous granular-looking inclusions which were not identifiable optically. The inclusions bore no relation to the existing grain boundaries which indicated that they had not been soluble in the molten metal. The EDS analysis of selected inclusions (Table 1:Oost3d-f) indicated that the inclusions consisted mostly of lead, commonly added to low tin bronzes to facilitate casting (Scott 1991:27).

Fig. 1 Photograph of the eroded bronze cannon handle from the "Oosterland" from which the sample was removed (scale in cm).

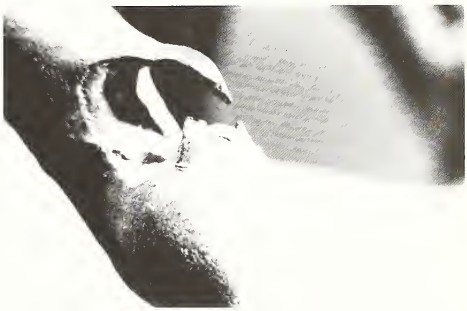

Fig. 2 Photograph of the bronze cannon from the "Oosterland" showing the sampled area and the sample removed.

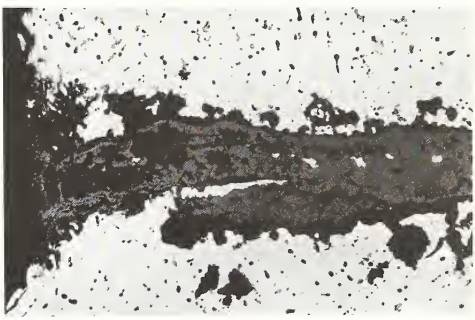

Fig. 3 Micrograph of the polished sample from the "Oosterland" cannon showing a corrosion filled crack and the casting porosity (dark voids) (15 X).

Fig. 4 Micrograph showing the lead-rich light blue-grey inclusions in the "Oosterland" cannon (112 X).

Fig. 5 Photograph of sample of corrosion layer from the inside of a bronze cannon recovered from the "Oosterland" (scale in mm).

Fig. 6 Polished section of corrosion layer from the inside of a bronze cannon recovered from the "Oosterland" showing layered structure (15 X).

Corrosion rind from bronze cannon

This sample was a fragment of the corrosion product from inside the second cannon, known to have been cast in 1685 (Werz 1989:16; Werz 1992:86).

The sample was a slightly curved, blueish-black sheet,

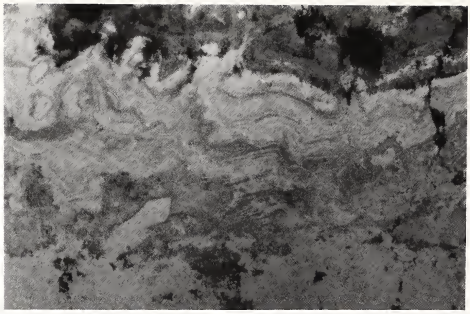

Fig. 7 Polished section of corrosion product from the inside of a bronze cannon recovered from the "Oosterland" showing finely banded layer devoid of sand grains (112 X).

with visible layering and bright green patches of copper corrosion product on both sides (Fig. 5). The convex-surface, presumably the one closest to the original metal, was slightly lighter in colour. The sample was 81,4 mm long, 42,8 mm wide, and varied from 2,2 mm to 3,8 mm in thickness. It had a mass of 17,69 g, and was non-magnetic.

In transverse section the material was clearly layered (Fig. 6). There were five layers. The outermost layer, originally nearest the metal, was thin, very porous, and consisted of structureless masses of cuprite (Cu_2O) and malachite ($CuCO_3$) containing sparse tiny rounded metallic droplets. The second layer, the broad light one in Fig. 6, consisted of finely banded blueish-white corrosion product, with no included sand grains, and what appeared to be the distorted ghost remnants of the former crystalline structure (Fig. 7). A raster bulk analysis of this layer indicated a composition of copper sulphide with 2,8% tin content, clearly derived from the parent bronze (Table 1:Oost4 a). The next layer was crowded with sand grains which became more dense towards the upper surface. This was followed by a second layer of relatively sand free light blue corrosion product and a final sandy layer, itself possibly internally banded.

The main corrosion product appeared to be mostly very fine grained cuprite and malachite. The microscopic banding in the second layer (Fig. 7) probably represented the corrosion of the original metal surface. The metallic droplets were probably reprecipitated copper resulting from the dissolution of the parent bronze (*cf.* Scott 1991:fig. 71).

Corrosion rind from breech of bronze swivel gun

This was a fragment of lamellar corrosion product removed from the interior of the breech of a bronze swivel gun recovered from the "Oosterland" by Bruno Werz. The sample was a slightly curved, blue-black sheet, similar in appearance to the cannon corrosion sample. There was a red copper oxide layer on the surface originally in contact with the metal, and corroded

Table 1. Results of energy dispersive X-ray fluorescence analysis.

SAMPLE (mode)	ELEMENTS WT. %										
	Si	S	Fe	Ni	Cu	As	Sr	Ag	Sn	Sb	Pb
Oost1 a inclusion (s)	-	-	-	-	15,5	7,6	3,5	-	-	21,0	52,4
Oost1 b inclusion (s)	-	-	-	-	45,0	6,8	1,8	-	-	5,9	40,6
Oost1 c crystals (r)		9,2	0,6	1,9	59,8	4,1	0,5	-	-	2,9	21,5
Oost1 d crystals (s)	-	10,0	0,4	0,7	56,1	7,3	-	-	-	2,6	22,9
Oost2 a rivet (r)	-	-	-	-	100	-	-	-	-	-	-
Oost2 b plate (r)	-	-	-	-	100	-	-	-	-	-	-
Oost2 c cuprite (s)	-	-	-	-	100	-	-	-	-	-	-
Oost2 d glass (r)	-	-	-	-	24,3	9,1	-	-	-	2,9	63,7
Oost2 e glass (r)	-	-	-	-	26,1	5,3	3,1	-	-	6,1	59,6
Oost2 f glass (r)	-	-	-	-	21,0	7,1	3,8	-	-	3,3	65,7
Oost2 g glass (s)	-	-	-	-	36,4	3,5	2,7	-	-	6,5	49,8
Oost2 h glass (s)	-	-	-	-	14,7	29,5	2,7	-	-	9,9	43,2
Oost3 a bulk (r)	-	0,3	-	-	96,5	-	-	-	3,6	-	-
Oost3 b bulk (r)	-	0,2	-	-	96,9	-	-	-	3,2	-	-
Oost3 c bulk (r)	-	0,3	-	-	96,6	-	-	-	3,4	-	-
Oost3 d inclusion (s)	-	-	-	-	7,3	-	4,7	-	-	-	88,0
Oost3 e inclusion (s)	-	6,1	-	-	4,2	-	1,1	0,7	-	-	87,6
Oost3 f inclusion (s)	-	-	-	-	6,6	-	4,4	-	-	-	89,0
Oost4 a corrosion (r)	3,4	10,2	-	-	83,6	-	-	-	2,8	-	-
Oost5 a corrosion (r)	0,8	9,1	3,9	-	79,2	2,5	-	-	4,6	-	-
Oost5 b corrosion (r)	3,9	10,4	2,8	-	81,0 (+Zn 1,6)		-	-	0,3	-	-
Oost5 c corrosion (r)	-	10,8	-	-	89,2	-	-	-	-	-	-
Swarf a metal (r)	-	-	-	-	96,0	-	-	-	4,0	-	-
Ssarf b inclusion (r)	-	12,1	-	-	87,9	-	-	-	-	-	-
Swarf c metal (s)	-	-	-	-	93,6	2,7	-	-	3,7	-	-
Bar a bulk (r)	0,4	0,7	-	-	98,9	-	-	-	-	-	-
Bar b bulk (r)	0,2	0,4	-	-	99,4	-	-	-	-	-	-
Bar c inclusion (s)	-	0,9	-	-	98,5	0,7	-	-	-	-	-
Bar d inclusion (s)	-	0,6	0,2	-	97,9	1,3	-	-	-	-	-
Bar e inclusion (s)	-	0,4		-	99,3	-	-	-	-	-	-
Bar f inclusion (s)	-	0,4		-	99,6	-	-	-	-	-	-
JB1 a bulk (r)	-	-	-	-	97,0	-	-	-	2,9	-	0,2
JB1 b inclusion (s)	-	22,0	-	-	78,0	-	-	-	-	-	-
JB2 a bulk (r)	-	-	-	-	93,7	-	-	-	5,6	-	0,7
JB2 b inclusion (r)	-	23,8	3,3	-	72,9	-	-	-	-	-	-
JB2 c inclusion (r)	-	-	-	-	77,1	-	-	-	22,9	-	-
JB2 d inclusion (r)	-	-	-	-	95,1	-	-	-	5,0	-	-
JB3 a bulk (r)	-	-	-	-	94,6	-	-	-	4,3	-	1,0
JB4 a bulk (r)	-	-	-	-	94,5	-	-	-	5,0	-	0,5

pepper corns trapped in the corrosion product adhering to the exposed surface. The sample was 8,87 g in mass, with a length of 50 mm, a breadth of 30 mm and an average thickness estimated to be about 4 mm.

A polished transverse section revealed a layered structure (Fig. 8).

i. The innermost layer was finely laminated, with some voids. It consisted of acicular blue inclusions which were probably remnants of an original metal

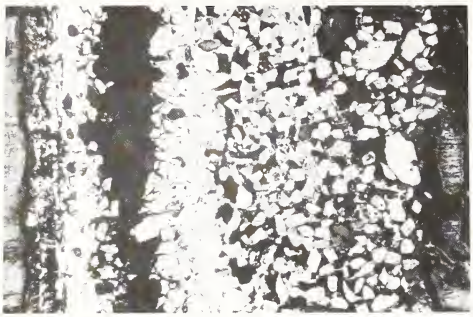

Fig. 8. Polished section of corrosion product from the inside of the breech of a bronze swivel gun recovered from the "Oosterland" showing layered structure (15 X).

Fig. 9 Etched section of bronze cannon swarf showing slip bands due to intense strain (180 X).

phase set in a blue oxide with no red reflections. This was not cuprite and optically it had the appearance of covellite, with very strong bireflectance and characteristic anisotropy (Craig & Vaughan 1981:336). Two bulk analyses of this layer showed it to contain about 10% sulphur and 80% copper overall, with the balance consisting of variable amounts of silica, iron, arsenic, zinc and tin (Table 1:Oost5 a & b).

ii. The middle layer consisted of quartz and calcite grains set in a light blue massive matrix which appeared isotropic under crossed polarised light. This layer was not analyzed.

iii. The outer layer consisted of a blue matrix with a composition of about 11% sulphur with a balance of 89% percent copper (Table 1:Oost5 c), containing numerous voids and included quartz grains with bright crystalline overgrowth which were probably calcite.

These analyses were very similar to those from the "Oosterland" bronze cannon and it is likely that they all had very similar if not identical bronze compositions.

Fig. 10 Polished transverse section of corroded sheet from the "Oosterland" showing the layered structure (7,2 X).

Bronze cannon swarf

This sample, submitted by Mr David Halkett, consisted of drill turnings from an unidentified bronze cannon housed at the Cape Town Castle.

The severe deformation of the turnings made a microstructural analysis impossible. In polished section etched with $NH_4OH:H_2O_2$ the grains displayed numerous twins and slip bands due to severe strain (Fig. 9). The metal was an even yellow with scattered blue inclusions showing a faint unevenness in colour. The highly strained metal grains had an elevated Vickers microhardness of HV 242 (200 g, 10 s, n = 2, 228 & 256). The raster bulk analysis of an approximately 40 micron square area indicated that the metal was a 4% tin bronze (Table 1:Swarf a). This is consistent with published analyses of seventeenth-century bronze cannon (Tylecote 1992:112). A spot analysis of the metal confirmed the approximately 4% tin, but there was also about 3% arsenic present in the region of this analysis (Table 1:Swarf c). An approximately 10 micron square raster analysis of one of the inclusions showed a composition indicating mixed copper oxide and copper sulphide (Table 1:Swarf b) which would account for the slight variation in colour observed in reflected light.

Copper corrosion specimen

This was a flat rectangular strip about 310 mm long, 55 mm wide and about 9 mm thick. It had a 90° bend on one side where it was broken, and appeared to be folded over on the other side to form a double layer over a thin inner layer. It was encrusted with sand and a few embedded peppercorns, and had adhering small barnacles. It was a dark purple on one side, and a brownish green on the other. The fractured surfaces were also a deep blue and appeared coarsely granular to the unaided eye. The mass of this fragment was 443,9 g and it was not magnetic.

Optical examination of the polished section showed

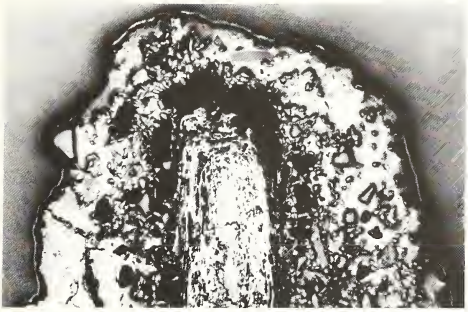

Fig. 11 Polished transverse section through the edge of the corroded sheet from the "Oosterland" showing the continuity of the corrosion layers (7,2 X).

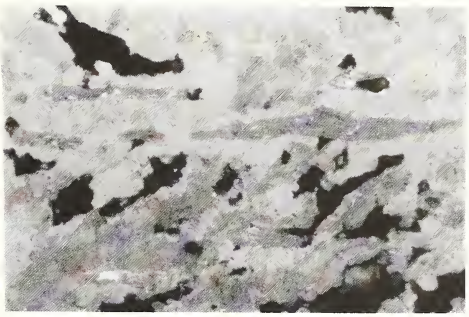

Fig. 12 Micrograph of the altered core of the corroded from the "Oosterland" sheet showing an elongated grey inclusion (560 X).

that it consisted of six layers (Fig. 10), with the outer five consisting of corrosion product layers continuous over the end of the original plate (Fig. 11).

1. There was a core, about 0,5 mm thick, of fine covellite (CuS) crystals arranged in a chevron alignment, pointing towards the original edge of the plate. The covellite was identified from its very distinctive optical properties (Craig & Vaughan 1981:336). The covellite was present as platy crystals, with a characteristic whitish blue colour in air. The pleochroism under plane polarized light was blue to white and the anisotropy under crossed polarized light was orange to yellowish brown. This core contained numerous elongated lenticular inclusions with a white reflecting matrix crossed by acicular grey crystals (Fig. 12). These inclusions were about 10 microns across and difficult to locate under the SEM but the analysis of two of them indicated that they contained primarily lead and copper with significant antimony, arsenic, and strontium

Fig. 13 Micrograph of the corroded sheet from the "Oosterland" showing the core (right) to the sandy layer 4 (left) (56 X).

(Table 1:Oost 1 a,b). There was a notable absence of sulphur in these inclusions. In reality they were probably oxides, but the EDS system used could not detect oxygen. This core represented the physical remains of the original copper plate, now completely corroded and transformed predominantly to covellite as a result of the chemical reaction of the copper with sulphur in the environment of burial.

2. The second layer, which completely surrounded the core, consisted of coarser covellite crystals with numerous irregular voids (Fig. 13). This layer was about 0,8 mm thick on each side of the specimen and contained a scatter of the inclusions present in the core. Layer 2 represented the primary corrosion product of the original plate represented by the core.

3. The third layer, concentric with layer two, was a discontinuous one, only about 100 microns thick. It contained bright, white reflecting, acicular crystals forming a line in the covellite matrix. These crystals were too small for individual analysis but a 5 micron by 5 micron square raster analysis and a spot analysis indicated similar compositions (Table 1:Oost1 c,d). The analyses of this layer contained predominantly copper and lead, with lesser amounts of sulphur, arsenic, and antimony, as well as traces of nickel, iron and strontium. The sulphur, and some of the copper, probably represented the covellite matrix between the acicular crystals. The lead, arsenic, and antimony was probably leached from some of the inclusions in the original copper plate as it corroded and were reprecipitated on the outer surface of the primary corrosion product.

4. The fourth layer, about 2,3 mm thick on each side of the specimen, consisted of more massive crystals of covellite and some blocky crystals of digenite

Fig. 14 Polished section through the copper rivet joining two sheets from the "Oosterland" (7,2 X).

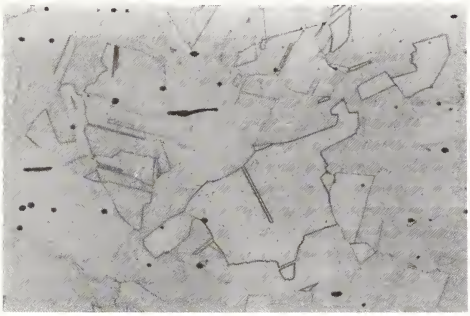

Fig. 15 Etched section of copper sheet from the "Oosterland" showing angular recrystallized grains with annealing twins (140 X).

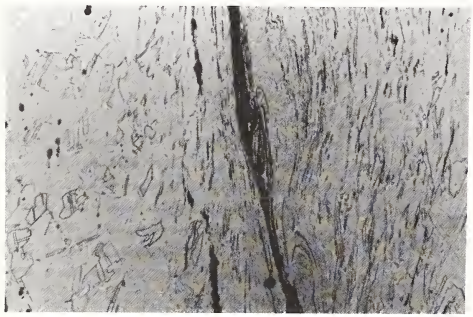

Fig. 16 Etched section through the sheet (left) and rivet (right) from the "Oosterland" showing extreme grain deformation (140 X).

(Cu_9S_5). The latter was identified by its pale blue colour and isotropic behaviour under crossed polarised light. This layer also contained dense areas of sand grains, including detrital quartz as well as some unidentified calcareous microfossils. This layer formed part of an integument of secondary corrosion products which made up the bulk of the specimen.

5. The next layer was about 1 mm thick on each side of the specimen and consisted of massed covellite crystals with some digenite intergrowths.

6. The outermost layer was a thin layer of fine, columnar covellite, with the long axes of the individual crystallites perpendicular to the outer margin of the specimen.

Copper sheet specimen

This specimen consisted of a copper rivet joining two sheets of copper (Fig. 14). The rivet had a maximum diameter of 6 mm and a thickness of 4,5 mm. The sheets were 0,7-1,3 mm thick. This copper sheeting was well preserved and had regularly spaced holes along one edge. The sheet was not magnetic.

The metallographic section showed that the rivet and the plates were made of optically similar materials. The average grain size was about ASTM 5-7. All the components had been cold-worked, annealed and recrystallised, as evidenced by the angular recrystallized copper grains with characteristic annealing twins (Fig. 15). These are indicative of cold-working followed by heating to above about 300°C (Maddin, Wheeler & Muhly 1980). The annealing was probably to soften the sheet after beating it out and before final shaping. All the components had suffered some cold-work after the anneal. The degree of grain deformation at the top of the rivet showed that it was more heavily cold-worked than the bottom face and the core of the rivet had very little residual cold-work strain. The margins of the rivet and the joined sheet were severely deformed (Fig. 16) by cold work during the emplacement of the rivet. The Knoop microhardness of the core of the rivet was $H_K = 96$ (50 g load, 15 s, range 88-101, $n = 5$) [adjusted value = 88]. The Knoop microhardness of the annealed sheet was $H_K = 94$ (50 g load, 15 s, range 83-98, n = 5) [adjusted value = 86] (cf. Vickers microhardness of pure copper, worked and annealed $H_V = 50$ to 60; pure copper, cold worked $H_V = 100$-120 (Scott 1991:82).

The bulk EDS analysis of the core of the rivet over a 1 mm by 1 mm square area indicated no detectable elements other than copper. The same was true of a spot analysis of the metal in the plate (Table 1:Oost2 a,b).

The rivet had a slightly higher density of inclusions than the sheet but they all had similar appearances. There were very sparse inclusions consisting entirely of cuprite (Cu_2O), identified by its characteristic blue colour and red internal reflections (Craig & Vaughan 1981). There were also rare, elongated, dark blue inclusions without any internal reflections. These were probably copper sulphides. The most numerous inclusions were rounded, or elongated glass inclusions, many with included droplets of cuprite (Fig. 17). The glass appeared crumbly

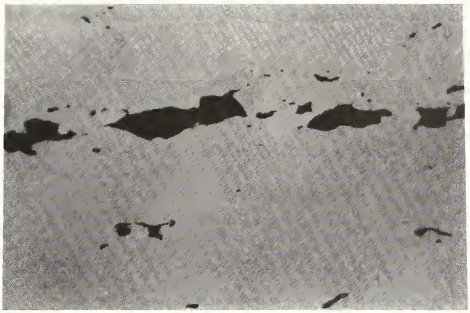

Fig. 17 Polished section through copper rivet from the "Oosterland" showing glassy inclusions containing cuprite globules (280 X).

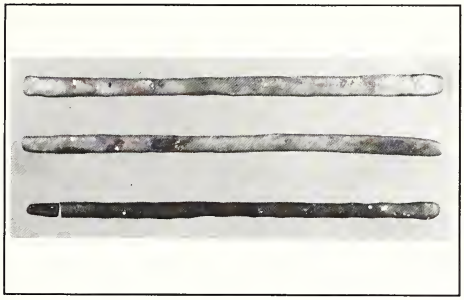

Fig. 18 Photograph of three copper trade bars from the "Waddingxveen" (maximum length 240 mm).

under interference contrast and had bright white internal reflections under crossed polarised light.

A spot analysis of a cuprite inclusion detected nothing but copper (Table 1:Oost2 c), but spot analyses and small raster analyses of the glassy inclusions (to take into account the possible inhomogeneity of the glass) showed compositions dominated by lead, with considerable copper, and significant arsenic, antimony, and strontium (Table 1:Oost2 d-h). These elements were present in generally similar proportions as the same elements in the elongated globular inclusions in the core of the corroded sample (Table 1:Oost1 a,b). The inclusions in the copper were glassy and probably represented mixed copper/lead oxides quenched to a glass.

Copper bar

Three copper bars recovered from the "Waddingxveen" were available for study. One had already been sampled for EDS analysis by Robert Knutsen, Department of Materials Engineering, University of Cape Town. A further sample was removed from this bar for metallographic investigation.

The bars were oval in cross-section, slightly flattened

Table 2. Mass and dimension of the copper bars.

MASS (g)	LENGTH (mm)	WIDTH (mm)	THICKNESS (mm)
89,6	210	10	6-8
120,2	235	10-12	6-8
112,6	240	10-12	5-7

on one side and appeared to have been cast into round-bottomed open moulds (Fig. 18). The unsampled bars varied slightly in mass and dimensions (Table 2) and obviously were not cast in identical moulds.

In section the sampled bar had a thin external rind of secondary cuprite and other oxidation products. There was some casting porosity, particularly near the middle of the bar (Fig. 19). The central voids were accompanied by irregular glassy inclusions often forming thin stringers between the central copper grains. The metal itself consisted of rounded dendritic grains of cast copper with blue globules of cuprite on the grain boundaries (Fig. 20; *cf.* Brooks 1982:fig. 8-3). Bulk raster analyses showed about 99 % copper with minor sulphur and silcon (Table 1:Bar a,b). A spot analysis of the interior of a copper grain showed no detectable alloying elements. The inclusions consisted of cuprite (Cu_2O) with minor sulphur and in some cases iron and arsenic (Table 1:Bar c-f). The Vickers microhardness of the copper grains was HV 54,9 (200 g, 10 s, $n = 5$, range 47,25-65,41) and their grain size was approximately ASTM 5.

This bar consisted of so-called tough pitch copper, a Cu-O alloy with about 0,05% oxygen (Brooks 1982), in the as-cast state. It represents a primary copper product which has not undergone deoxidizing or other refining.

JB1 "Bato"

This sample was from the identified wreck of the Dutch warship "Bato" (1806). The sawn specimen measured 8 mm by 12 mm in maximum cross section and had a mass of 1,41 g. It was not magnetic.

Optical examination of the section etched with an alcoholic $FeCl_3$ solution showed that it consisted of a single phase bronze, with a cored dendritic structure typical of a slowly cooled casting. The bulk was very porous and had not been annealed. Slip banding in some of the grains was evidence of residual cold work. The bulk composition contained just under 3% tin and a small but detectable amount of lead (Table 1:analysis JB1 a).

i. In the electron microscope the lead inclusions were visible as small bright spots trapped between the dendritic arms.

ii. There were also globular to elongated non-etching blue inclusions which consisted of a copper sulphide (Table 1:analysis JB1 b), close in composition to chalcocite (Cu_2S), a common inclusion in copper-based alloys.

iii. There were very sparse irregular light blue inclusions with even lighter reticulations of an exsolved phase.

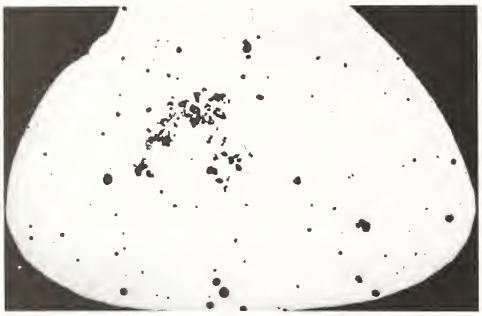

Fig. 19 Polished transverse section of a copper trade bar from the "Waddingxveen" showing casting porosity (7,2 X).

Fig. 20 Polished section of a copper trade bar from the "Waddingxveen" showing rounded copper grains with cuprite droplets on the grain boundaries (224 X).

iv. Very sparse dark blue-grey inclusions had bright internal reflections under crossed polars. These may have been a copper oxide glass or a transparent mineral such as sphalerite (ZnS).

JB2 "Brunswick"

This sample was from the identified wreck of the "Brunswick", a British East Indiaman wrecked in 1805 (J. Boshoff pers. comm.). The sawn pyramidal specimen measured 6 mm by 10 mm in maximum cross section and had a mass of 0,94 g. It was not magnetic.

Optical examination of the section etched with an alcoholic $FeCl_3$ solution showed that it consisted predominantly of a single phase bronze, with a cored dendritic structure typical of a slowly cooled casting. The bulk was very porous and had not been annealed. There was no evidence of cold work. The bulk composition contained 5,5% tin and nearly 1% lead (Table 1:analysis JB2 a).

i. The lead inclusions were visible as bright spots under the electron beam.

ii. Numerous, blue globular inhomogeneous droplets consisted of two phases. The major component was a copper sulphide with a composition approximating that of chalcocite (Cu_2S) with a small iron impurity (Table 1:analysis JB2 b), and the minor component had the composition of sphalerite (ZnS) (analysis not recorded).

iii. Characteristic complex multiphase inclusions were common. These consisted of various crystalline Cu/Sn phases associated with irregular droplets of lead. All of the components of these inclusions were inhomogeneous. Under the electron beam the brightest phase proved to be predominantly lead (analysis not recorded). The intermediate grey phase contained a darker eutectic exsolution but had a bulk composition indicating a 23% tin bronze (Table 1:analysis JB2 c), corresponding in composition to the high temperature beta phase (Scott 1991). The darkest phase in the electron image consisted of blocky inhomogeneous crystals with a tin content slightly lower than that of the bulk bronze matrix (Table 1:analysis JB2 d). This phase was light pinkish yellow under plane polarised light, and on etching stained a honey brown. These were low tin copper.

iv. There were very sparse grey-blue single phase inclusions with bright internal reflections under crossed polarised light. These were probably single crystals of sphalerite.

JB3 Unidentified

This sample was submitted without identification to act as a control check on the identification procedures. The sawn specimen measured 8 mm by 14 mm in maximum cross section and had a mass of 1,11 g. It was not magnetic.

Optical examination of the section etched with an alcoholic $FeCl_3$ solution showed that it consisted of a single phase bronze, with a cored dendritic structure, largely recrystallised by annealing. There was considerable evidence of cold work in the form of slip bands within the crystals. The specimen was severely corroded and etched far more rapidly than the other three. The porous bulk had a composition containing about 4% tin and 1% lead (Table 1:analysis JB3 a).

i. There were numerous opaque dark grey globules, without internal reflections.

ii. Sparse light blue two phase inclusions were associated with pinkish brown cuboids which etched honey brown. These cuboids, representing low tin copper crystals, surrounded many of the voids. They may have been the result of selective leaching of tin from the exposed metal around the porosities.

JB4 Rudder

This sample was from the disassociated rudder, and

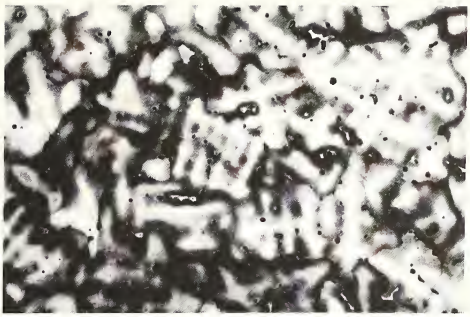

Fig. 21 Cored dendritic structure of the rudder sample JB4 after etching for 10 seconds in alcoholic $FeCl_3$ solution. The inclusions tend to occupy intersticies between the dendritic arms (50 X).

Fig. 22 Complex inclusions in the rudder sample JB4 (280 X).

the identification of its provenance was the main object of the investigation. The sawn specimen measured 4 mm by 17 mm in maximum cross section and had a mass of 0,70 g. It was not magnetic.

Optical examination of the section etched with an alcoholic $FeCl_3$ solution showed that it consisted predominantly of a single phase bronze, with a cored dendritic structure typical of a slowly cooled casting (Fig. 21). The bulk was porous and had not been annealed. There was no evidence of cold work. The bulk composition contained 5% tin and about 0,5% lead (Table 1:analysis JB4 a). In appearance it was very similar to Sample JB2.

i. Dark blue globular inhomogeneous droplets consisted of two phases, the darker of which had bright red internal reflections in crossed polarised light. These were probably cuprite.

ii. There were numerous single phase dark grey-blue inclusions with bright internal reflections.

iii. The characteristic complex multiphase inclusions consisted of various crystalline Cu/Sn phases associated with irregular droplets of lead, and cuboid pinkish brown tin-poor copper crystals (Fig. 22).

iv. In the SEM free lead inclusions were visible as small bright spots trapped between the dendritic arms.

DISCUSSION AND CONCLUDING REMARKS

The analysis of the metallic sample showed that the "Oosterland" cannon was made of an unremarkable bronze alloy with approximately 3,5% tin and a minor amount of lead. The only sample for comparison from the Cape consists of the drill turnings from the unidentified bronze cannon housed at the Cape Town Castle. The Castle cannon was made of a 4% tin bronze, consistent with published analyses of seventeenth-century bronze cannon (Tylecote 1992:112). This cannon did not appear to contain lead, but about 3% arsenic was detected, and the inclusions consisted of mixed copper oxide and copper sulphides.

Very few conclusions can be drawn from comparative analysis of only two samples. It is therefore recommended that in future samples should be taken systematically from other bronze cannon and large military hardware of the Dutch VOC period to characterise the range in variation in the material used and to determine any temporal trends or variations in application.

The analysis of the cannon corrosion product from the second "Oosterland" cannon records something of its post-burial history. The macroscopic layering, with varying densities of sand, point to a fluctuating chemical and physical environment, possibly with successive episodes of burial and exhumation. Unfortunately a sample of the original metal was not available for analysis. It would have been interesting to compare the chemistry of the metallic droplets in the corrosion product with that of the inclusions in the parent bronze.

The chemical analysis of the inclusions in the copper corrosion product confirmed its identity with the uncorroded strips. The inclusions in the corrosion sample did not appear to be fully glassy although their chemical composition was very similar to the glassy phases in the copper. Presumably, the corrosion of the copper allowed the unstable glassy components of the inclusions to react, partially devitrify, and recrystallize to produce the acicular grey crystals observed in the brightly reflecting matrix. The chemical similarity of the glassy phase in the copper sheets and the residual inclusions in the corroded strip leaves no doubt that the latter is a severely corroded fragment of copper sheeting.

The extreme difference in the degree of corrosion is provocative. Obviously, under the circumstances of marine burial copper sheeting can survive virtually uncorroded for many hundreds of years. But in the case of this sheeting part of the material was in very close proximity to a plentiful supply of sulphur to provide the

reactant to produce covellite. It is known that copper sheeting was often used to line rooms in the vicinity of the gunpowder room to minimise the risk of fire (B. Werz pers. comm.). When the ship sank, the rupture of barrels of ready mixed gunpowder or of raw sulphur may have created localised concentrations of sulphur on the copper cladding. If these concentrations were not dispersed by current action then they would have provided suitable chemical conditions for the selective reaction and corrosion of some of the copper sheets and cladding strips.

This would have required locally stable post-depositional conditions which is borne out by the morphology of the corrosion products. Reaction of the copper with the sulphur would proceed at the margins of the metal sheet (layer 3), slowly trapping sand grains (to build layer 4) as well as invading the corroding metal which expanded with the progressive in situ crystallisation of corrosion products (layer 2) until corrosion reached the core (layer 1). The immediate environment was enriched with copper leached from the corroding metal and this enabled nearly pure, large crystals of covellite to crystallise slowly on the outside of the trapped sand grain layer, incorporating peppercorns and other debris in the process (in layers 5 & 6).

The metallographic study of the copper bar ingot was not particularly revealing and in itself tells us nothing about its possible provenance. The trace element study conducted at the British Museum identified the source of the copper bar as Japan (P. Craddock pers. comm.). This is not surprising because the "Waddinxveen" was known to have been on its return voyage from the Far East (B. Werz pers. comm.).

The study of the bronze rudder samples pointed to the "Brunswick" as the origin of the disassociated rudder. The physical structures and bulk chemical analyses of these four samples were very similar. They were all leaded, low tin bronzes, with cored dendritic structures. Two samples showed evidence of cold work and one had been annealed, but this was due to fabrication and was not an intrinsic identifying characteristic.

Sample JB3 look superficially distinct under the microsocope because of its being severely corroded, containing more numerous internal voids, having more plentiful tin-poor copper-rich areas, and etching more rapidly than the other three samples. In terms of the inclusion suite sample JB1 (from the "Bato") was distinct, with far fewer of the complex light blue inclusions and no associated pinkish cuboid crystals. Samples JB2 and JB4 are closest to each other in appearance, but JB2 lacks the numerous blue-grey inclusions with bright internal reflections which are numerous in JB4. Apart from these differences, samples JB2, JB3 and JB4 had similar suites of inclusions and on the basis of this observation the highest probability is that the rudder is associated with the wreck of the "Brunswick".

Three of the four bronze samples were very similar in bulk composition, but had subtle differences in their inclusion suites. The minor differences in tin and lead content could be due to large scale inhomogeneity in the large castings from which these samples were taken, or slightly different bronze compositions may have been used for different components on any individual vessel. This could also explain the differences in inclusion suites in samples JB2-4. JB1 appeared to be distinct both in terms of chemical composition and inclusions and bears the least resemblance to the rudder.

The archaeometallurgical studies reported here are the first addressing various problems of identification and interpretation on maritime material from the Cape. As such, these are preliminary investigations, but they illustrate something of the range of questions that can be addressed with standard metallurgical techniques. The analysis of the bronze cannons initiates what hopefully will become a growing body of data about the composition of early colonial metals brought to and used at the Cape. The study of the corroded copper strips, not only identified them for what they were, but provided insight into the storage and structural arrangements of the vessel. The association of the detached rudder with the "Brunswick" would not have been possible without the detailed analysis of the inclusions in its bronze components. And the trace element analysis of the copper bar, although not reported here in detail, enabled staff at the Department of Scientific Research at the British Museum to identify the source of the copper as Japan.

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EXAMINING THE USE OF STARCH GRAIN RESIDUES TO IDENTIFY PLANTS PROCESSED IN STONE AGE CONTEXTS*

CAROL WALLACE

Department of Archaeology, University of the Witwatersrand
Private Bag 3, Wits 2050, Johannesburg

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ABSTRACT

Residues present on the surface of stone tools have the potential to identify the kinds of substances certain tools were used on and possibly elucidate tool function. In particular, it has been suggested that starch grains present from plant residues may be used to identify the genus or species of the plant. A study was conducted to determine the feasibility of extracting starch residues from grindstones and using starch grain size and morphology to determine the type of plant processed. A reference collection was established with various indigenous southern African plants. Starch grains extracted from the grind stones were compared with reference collection samples. Results indicate that using starch grain morphology and size as a means of plant identification in a Stone Age context is difficult, if not impossible.

INTRODUCTION

Stone tools of every kind are probably the most abundant archaeological material found on Earth. While their size and morphology have been used to place them into broad categories, there is very little about these two features that can tell us how they were used, and what kinds of materials they were used on. In recent years, progress has been made in use-wear analysis and the study of organic residues on the surface of stone tools. These two fields can now provide some clues as to tool use in the past. Most analyses of organic residues begin with the microscopic examination of the stone tools. A study was undertaken to examine the feasibility of extracting starch grains from tools such as grind stones that are too large to place under a microscope. The second part of the work was to examine the possibility of identifying plants worked on with these and other southern African tools based on the size and morphology of the starch grains.

Starch grains have been found to be present on the surfaces of stone tools from all around the world (Loy *et al.* 1992). These are usually present in large amounts on tools that can be examined under the microscope. Their abundance, as well as distinctive properties, has lead some researchers to claim that identifying these grains to the genus or even species level is possible (Loy *et al.* 1992; Barton & White 1993).

A number of techniques exist that have been used to identify starch grains according to their species of origin. These include both chemical and morphological methods. Chemical methods include the temperature at which the grains loose their structure, the rate at which they are affected by iodine and the rate at which they loose their structure when exposed to caustic chemicals. These techniques however are limited for use in an archaeological contexts due to the typically small number of starch grains preserved on tool surfaces as well as their destructive nature (Loy *et al.* 1992). Morphological properties such as size and shape have been used in several studies and appear to be more promising (Loy *et al.* 1992; Fullagar 1994; Barton 1994). In most studies, the tools were examined using light microscopy and tentative identification was based on the comparison of starch residues with a reference collection in terms of size and shape.

Starch grains are composed of two related polymers, amylose and amylopectin, and are formed within subcellular structures known as plastids. Plastids are defined primarily by their ability to produce starch and are divided into several types, of which chloroplasts and amyloplasts are the most important for archaeological purposes. Chloroplasts are mainly associated with leaves, contain chlorophyll and are involved in photosynthesis. Amyloplasts are found in the storage organs of plants such as roots, tubers and corms. Starch grains are formed from a nucleation point and grow by the accumulation of layers of amylose and amylopectin around this point which is commonly known as the hilum. When viewed under cross-polarized light, these layers, together with the quasi-crystalline nature of the amylose and amylopectin, produce a birefringent effect in the form of an "extinction cross" or "Maltese cross". This pattern

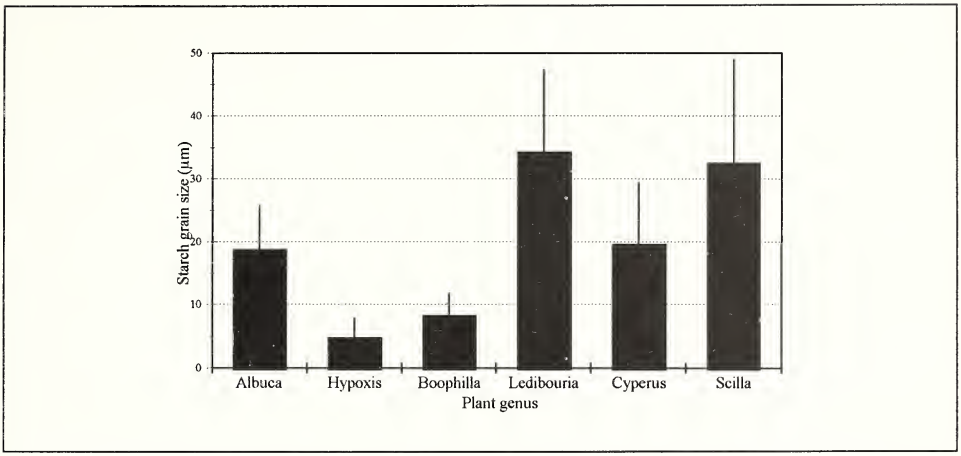

Fig. 1: Average size and standard deviation of reference collection.

consists of two dark bars crossing at the hilum with bright areas of light in between them.This characteristic of starch grains is very useful for distinguishing them from other residues.

OBTAINING THE SAMPLES

Twenty grindstones of varying size and shape were taken from two different levels from Rose Cottage Cave in the eastern Free State. All except three of the stones were too large to be examined using a microscope. Samples were taken at random from the entire surface of the tool, with particular attention being paid to cracks where microscopic residues would be expected to occur. Samples were obtained by applying ~ 100μl of sterilised distilled water to the tool and scraping the surface to slightly loosen residues. The solutions were removed using a micro-pipette and placed into an eppendorf tube. Approximately 50μl of each sample was then applied to a glass slide and allowed to dry. Finally they were covered with a coverslip to protect the sample.

Each slide was examined using a transmitted light microscope. The samples were rehydrated using 40μl of ultra-pure water in order that the grains may regain their natural shape. All slides were examined within an hour of rehydration. The samples were initially scanned under polarized light at a magnification of 160x. If the characteristic "Maltese cross" was observed, the starch grain was photographed under a higher magnification under normal transmitted light and its sized recorded. The three smaller tools were examined directly under incident light for starch grains and other plant residues.

ESTABLISHING A REFERENCE COLLECTION

The plants used to establish the reference collection included the following genuses: *Gynandiris, Cyperus, Gladiolus, Hypoxis, Ledibouria, Albuca* and *Scilla*. All of the above plants have species that are edible or are known to have been used in a medicinal context in traditional societies. Only the bulbs, corms or their underground storage organs were used in establishing the reference collection. At least three samples of each genus were obtained in order to observe any variation within genuses. Reference collection samples were prepared by macerating tissue from each plant and applying a small amount to a glass slide. Two slides were prepared for each specimen.The first was stained with iodine and fixed semi-permanently using glycerol. The second was allowed to air-dry and protected with a glass coverslip. This was done in order to determine whether the effect of dehydration had any significant effect on the average size and morphology of the grains. As with the samples collected from the tools, these specimens were rehydrated using ultra-pure water before being examined under the microscope. Specimens from each genus were photographed at various magnifications. Average starch grain size was also determined. This was done by selecting five sites at random on each slide and measuring the minimum and maximum length of 20 starch grains at each site. Mean size and standard deviation are displayed in Figure 1. The reference collection samples are classified according to shape in Table 1.

RESULTS

The method described above proved effective at removing starch grains from grind stones. Of the twenty grind stones examined, thirteen of them had significant numbers of starch grains. In particular, Mn5 and Mn7 had samples with well over 100 grains. Where only a few grains were observed, futher sampling would hopefully provide a more significant number. It should be noted that the absence of starch grains in the samples from the

Table 1. Shape categories of the reference collection based on the classification by Fullagar (1994).

Genus	Shape category	Comments
Hypoxis	Round	Tend to be small
Albuca	Elliptical	Characteristic notch, smaller grains tend to be round
Gynandiris	Elliptical	Fairly irregular in shape
Ledibouria	Elliptical	Larger grains tend to be irregular
Scilla	Round / Elliptical	Smaller to medium grains tend to be round
Gladiolus	Sub-angular	Sometimes two or more facets

Table 2. Size and shape category of starch grains found on grindstones.

	Mn1	Mn3	Mn5	Mn7	Mn9	A1	A2	A4	A6	A7
Round	8µm - 10µm		5µm - 15µm	4µm - 23µm		4 8µm -		6µm	1.6µm - 5µm	12µm - 27µm
Sub-round	10µm - 13µm		5µm - 8µm		7µm - 10µm	9µm		4µm - 12µm	8µm - 13µm	10µm - 19µm
Eliptical	15µm - 23µm						4.5µm - 4.8µm		11µm - 19µm	11µm - 21µm
Angular	12.5µm - 25µm				12µm		14µm	26µm	14µm - 24µm	
Sub-angular		9.5µm							14µm - 16µm	
Undefined				12µm	14µm			12µm		

other seven tools may be due to sampling error and is not necessarily an indication that they were not used to work plant resources.

Starch grains were classified according to their basic shape as described by Fullagar (1994) (Table 2). It was noted that dehydration had little or no effect on the size or shape of the starch grains, although these reference samples had only been dehydrated for a few weeks, not the years that would be expected from archaeological samples. Several tools in the collection had grains of a very distinctive shape. Many had round grains of varying size, while others had angular grains with five sides. None of these angular grains matched any of the plants in the reference collection. The round grains pose a problem in that many of the plants in the reference collection have varying proportions of round grains. All three of the tools examined directly under the microscope had a substantial number of starch grains as well as other plant fibres. These grains tended to be very small, in the region of 2-4μm.

DISCUSSION AND CONCLUSIONS

While this proved an effective method for starch grains from grind stones in significant numbers, the identification of these grains to genus or species was difficult. The reference collections in the case proved to be too small to allow the positive identification of any plants based on their starch grains found on the surface of the tools. However, even when large reference collections are available, identification of the plant of origin based on the size and shape of starch grains in any archaeological context is problematic (Therin 1994). This is due to the nature of the archaeological record as well as the nature of starch grains. Archaeological samples are usually small in nature. This problem is compounded by the fact that more than one species may be present on any particular tool. Variation in size and morphology can also occur not only within each species, but within any particular plant, a fact that many researchers have not taken into account. Variation in starch grains size depends on several factors (Therin 1994). The location and function of starch grains within the plant are important in determining size and morphology. For instance, starch grains produced in the chloroplasts by photosynthesis are usually very small. They grow in available spaces and therefore have no defined shape. On the other hand, the morphology of starch grains found in the amyloplasts is thought to be controlled genetically and tends to be more defined. The degree to which the grains are packed seems to play an important role in their morphology, with loose packing resulting in rounder

grains and close packing producing more angular grains. The age of the plant organ in which growth occurs effects the size and shape of the grains. In general, the longer the period of reserve starch growth, the larger the granules become (Badenhuizen 1964). These larger granules tend to have a more regular shape than the smaller and younger granules. Factors such as the availability of water and nutrients as well as soil composition constrain plant growth and can affect size and shape of starch grains.

Thus on any particular tool, variation in starch grain size and shape could be the result of several factors; the presence of more than one species, the part of the plant processed with the tool, the age of the plant processed and environmental conditions governing the growth of the plant. These factors are complicated by the fact that at present, shape is defined in terms of a small number of categories. With the number of plant species available to hunter-gatherers living in the eastern Orange Free State it is likely that several species or genuses will be of the same shape category and have size ranges that overlap. It is clear that even where an extensive reference collection is available, the use of starch grain size and morphology as a means of identifying the plant origin is problematic. There are however, some cases where identification may be possible, as long as the limitations are kept in mind. For instance, where it is likely that grindstones were used to process large amounts of produce from the same part of plants that were harvested at the same time. Such an example would be Iron Age contexts where it may be possible to determine whether the staple crop was maize as opposed to sorghum or millet in areas where this is disputed. Given a large enough reference collection as well as large, well-preserved samples it may be possible to resolve such disputes based on the techniques described above. It would seem however, in stone age contexts, where so many factors may affect the size and shape of starch grains present on the tool, the identification of plant species will continue to remain problematic, if not impossible.

ACKNOWLEDGEMENTS

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USEWEAR ANALYSIS OF ROBBERG BLADELETS FROM SEHONGHONG SHELTER, LESOTHO*

JOHAN BINNEMAN

Archaeology Department, Albany Museum, Grahamstown, 6139

and

P.J. MITCHELL

Pitt Rivers Museum, 64 Banbury Road, Oxford OX2 6PN, United Kingdom

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ABSTRACT

The late Pleistocene Robberg Industry is the earliest well-defined expression of the southern African Later Stone Age and is typified by the presence of large numbers of bladelet cores and bladelets. Ethnographic and archaeological analogies have previously been used to suggest that these bladelets were employed as inserts in composite weapons or knives. Microwear analysis of Robberg bladelets bearing traces of mastic from recent excavations at Sehonghong rock shelter in the Lesotho highlands shows that they were mounted parallel to their haft and at least sometimes reversed and re-used in their mount. Wear traces indicate that most were used to cut organic materials, particularly hide and soft plant materials. Though a function as components of projectile weapons is not excluded, it is evident that Robberg bladelets had a multiplicity of uses.

INTRODUCTION

The Robberg Industry is the earliest well-defined expression of the southern African Later Stone Age. Initially defined on the basis of excavations from Nelson Bay Cave in the Western Cape Province (Klein 1974; Deacon 1978), it has since been recognised at sites across South Africa, as well as in Lesotho and Swaziland (Deacon 1984a; Mitchell 1988a; 1988b; Wadley 1993).

While microlithic, and featuring a similar range of formally retouched artefacts to those known from middle and later Holocene assemblages, it is quite different from Later Stone Age (LSA) occurrences that postdate 12 000 BP. These differences reside partly in the very low frequency with which formal tools such as scrapers, adzes and backed microliths are present, and partly in the heavy emphasis placed on the manufacture of bladelets from specialised bladelet cores.

Though varying between sites and assemblages, the frequency of such bladelets can reach as much as 25% of all whole flakes (Wadley 1996). These bladelets were most often struck from single platform bladelet cores, but, particularly in those assemblages dominated by quartz, bipolar reduction was also practised (Mitchell 1988b). This technique resulted in the production of many core-reduced pieces, and in quartz-rich Robberg occurrences, what Deacon (1984a) termed small and flat bladelet cores.

Bladelets form the hallmark of Robberg technology. Though found in the hundreds or thousands in Robberg assemblages and clearly deliberately produced, the function of these bladelets has been little researched. Both Deacon (1983) and Parkington (1984) suggested that they might have been used as inserts in stabbing spears comparable to the well attested and highly effective 'death spears' of Aboriginal Australia (Flood 1995). The possibility that Robberg bladelets were used as inserts in projectile points or other multi-component tools, such as the taap-sawknives known from Western Australia (Mulvaney 1969:93), was considered in greater detail by Mitchell (1988a). However, in the absence of information on the uses to which Robberg bladelets were actually put, such discussion, which considered a wider range of archaeological analogies, remained speculative.

THE ROBBERG ASSEMBLAGES FROM SEHONGHONG

Sehonghong (29.46S; 28.47E) is a large sandstone rock shelter situated on a tributary of the Orange (Senqu) River in the eastern highlands of Lesotho (Fig. 1). Originally excavated in 1971 by P. Carter (1978), the site

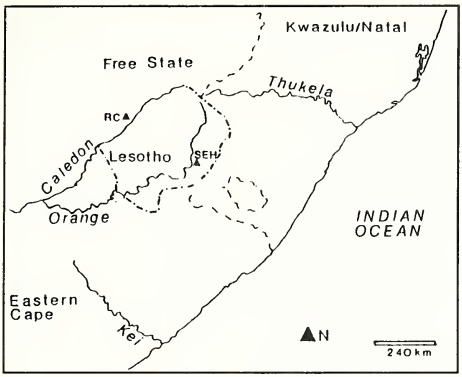

Fig. 1. Location of Sehonghong rock shelter.

Carter's (1978) initial excavations at Sehonghong identified the presence of a bladelet-rich assemblage associated with a single radiocarbon determination of terminal Pleistocene age (13 000 ± 140 BP (Pta-884); Carter & Vogel 1974). Subsequently this assemblage was identified as a variant of the Robberg Industry of the Eastern and Western Cape (Klein 1974) and bracketed between dates of 13 200 ± 150 and 12 200 ± 250 BP (Carter *et al.* 1988). This picture was largely confirmed by the 1992 excavation, which identified Robberg assemblages in two layers - RF and RBL/CLBRF - dated to 12 180 ± 110 and to 12 410 ± 45 and 12 470 ± 100 BP respectively (Mitchell 1995a).

A small Robberg assemblage recovered from a lens dates to 11 090 ± 230 BP, while an older expression of what has been identified as the same industrial tradition dates to between 20 200 and 19 400 BP (Mitchell 1995a). All the artefacts discussed in this paper come from RF or RBL/CLBRF (Fig. 2).

In the Robberg assemblages at Sehonghong bladelets

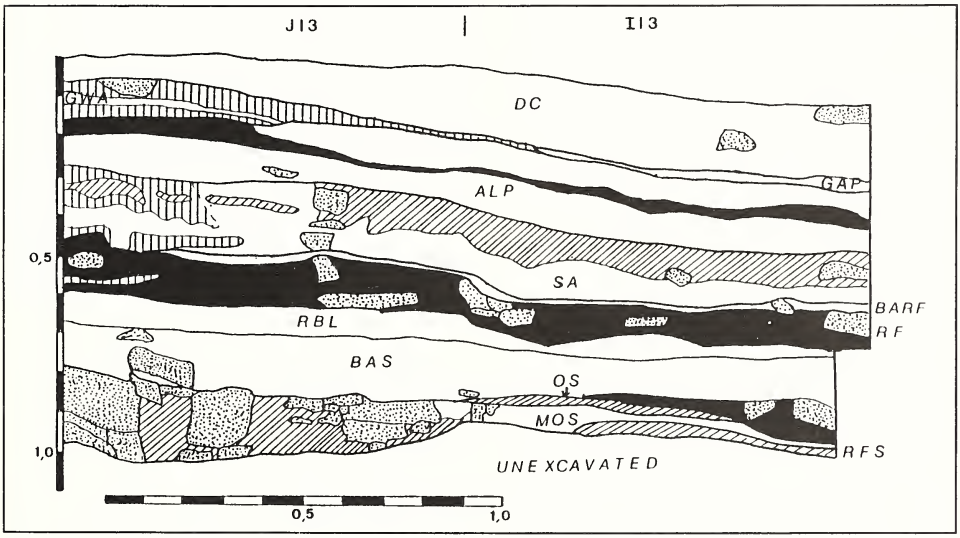

Fig. 2. Sehonghong: partial section of the north wall.

has a long sequence of Middle and Later Stone Age assemblages, possibly extending back as far as the Howieson's Poort at its base (Carter *et al.* 1988).

Historical sources show that the site was still used by local hunter-gatherers in the late nineteenth century (Vinnicombe 1976). Sehonghong was re-excavated in 1992 as the initial stage of a project that aims to reassess existing models of hunter-gatherer land use and palaeoenvironmental change in the Lesotho highlands (Mitchell 1993). While analysis of the faunal and botanical samples from this excavation is still in progress, details of the cultural-stratigraphic sequence have already been reported (Mitchell 1994; 1995a; 1996a; 1996b).

were almost invariably struck in opalines (also known as crypto-crystalline silicas or CCS), which are locally available as nodules in river gravels and as veins exposed at the surface of the lavas that overlie the sandstone in which rock shelters such as Sehonghong have formed. Bladelets account for 40.5% of all whole flakes larger than 10 mm in RF and 48.9% of such flakes in RBL/CLBRF.

The large numbers of proximal, mesial and distal bladelet sections indicate that these figures probably underestimate the scale on which bladelets were produced. The large numbers of bladelets found suggests that, though generally unmodified, it is these artefacts,

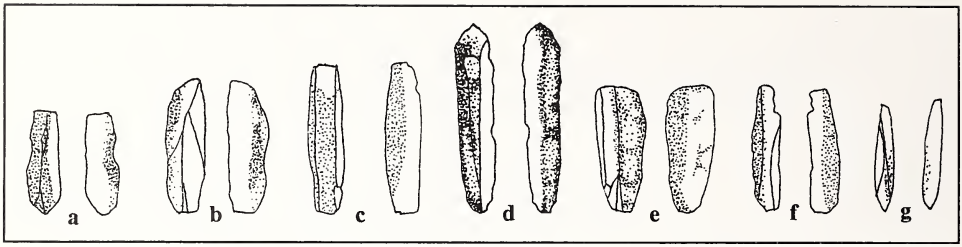

Fig. 3. Bladelets from Sehonghong examined for wear traces. Stippling denotes mastic.

rather than the rare retouched tools, that are the most 'formal' component of the Robberg stone working tradition. This view is strengthened if we consider the care and degree of standardisation applied to their manufacture.

High-backed bladelet cores, generally with single platforms, are the dominant core-type used to produce Robberg bladelets at Sehonghong. The higher frequency of such cores in RF, as opposed to bladelets removed in a plane different from that of the platform in RBL/CLBRF, suggests some chronological variation within the Robberg tradition. The very small bulbs of percussion and striking platforms on the bladelets suggest that a punch technique was used to produce them, although the bipolar technique can produce similar bladelets (see Barnham 1987).

The bladelets are quite standardised in size, particularly in width, compared to the relatively few bladelets found in other Later Stone Age assemblages at Sehonghong: for RF and RBL/CLBRF mean lengths and widths are 18.8 $\pm$ 6.4 and 17.5 $\pm$ 5.2 and 6.5 $\pm$ 2.3 and 6.2 $\pm$ 1.8 mm respectively. Utilised bladelets are slightly longer. Relatively few of the bladelets found at Sehonghong or in other Robberg assemblages show macroscopically visible evidence of utilisation or retouch. The overwhelming majority of those that do exhibit what Deacon (1984a) terms simple edge-damage (as opposed to steep utilisation or notching), take the form of light 'nibbling' along one, or sometimes both, lateral edges. This, and the acute edge angles on utilised bladelets from the 1971 excavation (Carter *et al.* 1988), suggest a primary use in cutting and/or slicing activities. Such utilisation is most common on the ventral surfaces of the RF and RBL/CLBRF bladelets and has also been noted at Rose Cottage Cave where Wadley (1991:128) comments that "many of the bladelets have extensive utilisation and occasionally shallow retouch on both cutting edges of the ventral surface".

At Sehonghong, only eleven of the more than 5000 bladelets from RF and RBL/CLBRF can be described as formally retouched; the majority of these are backed, either parallel to the unretouched edge or to a point, though ventral retouch and distal truncation are both represented by single examples.

During excavation a group of 44 artefacts from RF and RBL/CLBRF, all made in opalines and all but five of them bladelets, were observed to be partly covered by a thin, glossy black film. This has been identified as mastic based on its colour, a location that avoids edges with macroscopically visible utilisation and the restricted range of artefacts on which it occurs. The physio-chemical characterisation remains has yet to be attempted. Fourteen of these bladelets (Fig. 3) were submitted for microwear analysis.

THE MICROWEAR ANALYSIS

Procedures

Prior to cleaning the bladelets, the black substance on the implements (SEH 12, 17, 27, 30 and 42) was examined by touching it with a hot needle. In all the cases the substance melted. Similar results were obtained from testing the 'mastic' used for hafting two other implements from archaeological contexts (Binneman 1983, 1994). This suggests that the black substance on the bladelets is of a similar organic composition.

The analysis proceeded along the lines established in earlier studies (Keeley 1980; Binneman 1982, 1984). The bladelets were soaked several times (30 minutes on average) during the examination, first in a 10% HCl solution and then in a 10% solution of KOH. They were then examined under an incident-light microscope using magnifications of between 50 and 400. The wear traces on the Sehonghong bladelets were compared with those in an experimental reference collection.

Results

Of the fourteen artefacts examined one (SEH 19) was not suitable for further analysis because of the presence of shiny mineral inclusions. Six (SEH 9, 14, 23, 28, 35 and 39) show wear traces that are not sufficiently well-developed for any conclusions to be reached as to their function, although three of these (SEH 9, 23 and 28) may have been used in contact with some kind of soft material. We therefore concentrate on the results obtained from the remaining seven bladelets.

SEH 12 (from I13-065, RF) (Fig. 3a)

A bladelet with straight laterals, a tiny bulb of percussion and striking platform and snapped at the distal

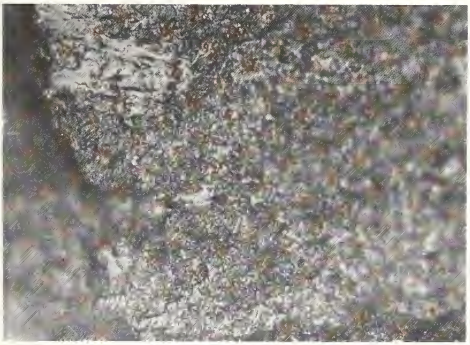

Fig. 4. Small patches of bone polish next to a flake scar on bladelet SEH 12 I13-065, RF. 200X.

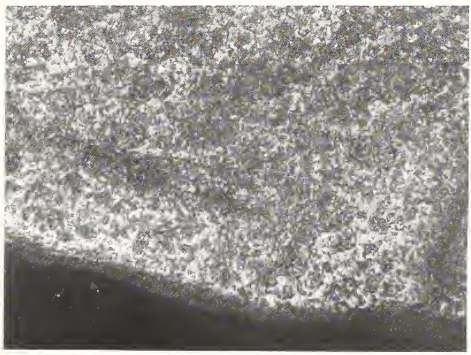

Fig. 5. Hide polish on bladelet SEH 17 M13-087, RF. 200X.

end. Mastic was present on two-thirds of the left lateral of the dorsal aspect and along the right lateral of the ventral aspect. The bladelet was hafted along the thin, sharp, low-edge angle and the stronger, higher edge angle was used to perform the activity.

Interlocking microflaking occurred along the right dorsal and left ventral laterals, suggesting that the bladelet was used on a 'hard' material. A few half-moon 'breakages' were present along the mastic-coated edges, but no micropolish or other usewear traces occurred here. Micropolish was weakly developed except near the distal end of the left ventral lateral and on the bulb of percussion. Small patches of bone polish (Fig. 4) occurred on the side-edges of the flake scars. 'Bright streaks' run parallel to the edge. The bladelet was used to saw/cut, and probably also to whittle, bone. However, because meat polish forms very slowly, it is possible that it may have been used to cut meat from bone, *i.e.* in butchery activities.

SEH 17 (from M13-087, RF) (Fig. 3b)

A bladelet with a small bulb of percussion and striking platform; straight right lateral and a left lateral edge which curve towards the right at the distal end. The bladelet was hafted along the thin, sharp, low edge-angle and the stronger, higher edge angle was used to perform the activity. The bulb has been removed. Mastic was present along the left lateral of the dorsal aspect and the right lateral of the ventral aspect. Microflaking is mainly visible on the opposite two laterals. Interlocking flaking were present on both aspects near the distal end and a second set of smaller 'crushing' flakes lined the immediate cutting edge. These wear patterns suggest cutting/sawing activities. A few half-moon 'breakages' were spaced along the dorsal left and ventral right laterals. Some were 'fresh' and appeared to be post-depositional. Others display traces of mastic and probably occurred during manufacture and/or hafting. No wear traces occur along these laterals and appeared not to have been used. A well-developed 'fine' micropolish was oriented parallel to the edge on both the right dorsal and left ventral aspects (Fig. 5). The cutting edges and the edges of the flake scars were rounded. Short and longer shallow U-shaped striae run parallel to these edges and long bright 'streaks' are also visible. These were probably caused by sand grains and/or small fragments of the bladelet caught between the tool and the material during contact. Near the proximal end of the left ventral lateral a few 'bright spots' run away from the immediate edge at approximately 45°. These resemble experimental wear produced by rubbing stone on stone. It is thus possible that the bladelet came into contact with stone when it was used, or that it was rubbed against another stone artefact when being carried around. The rounded edges and 'fine' micropolish suggest that this bladelet was used to cut soft material, most probably hide.

SEH 27 (from K12-067, RBL/CLBRF) (Fig. 3c)

A bladelet with a small bulb of percussion and striking platform and straight laterals. Mastic covered virtually the complete dorsal aspect and most of the right lateral of the ventral aspect. Interlocking flaking were present along the right ventral lateral, the larger flakes were lined with a second row of 'crushing' along the immediate edge. Small flakes were spaced along both the right dorsal lateral and left ventral lateral. Micropolish was well-developed along the immediate edges of all four laterals (Fig. 6). The well-developed polish present on those laterals covered by the mastic indicates that they have been used and that the bladelet was therefore turned in its mount. Polish was best developed around and between the flake scars and appeared to 'flow' parallel to the working edge. This is most probably due to prolonged 'cutting' actions. Striations were generally absent, with only a few, short, fine striae parallel to the edge. The micropolish resembled that produced experimentally by working soft plant materials such as reed and sedge. This bladelet was used to cut and whittle soft vegetal material.

SEH 30 (from J12-067, RBL/CLBRF) (Fig. 3d)

A bladelet with a small bulb of percussion and striking platform and straight laterals. Mastic covered

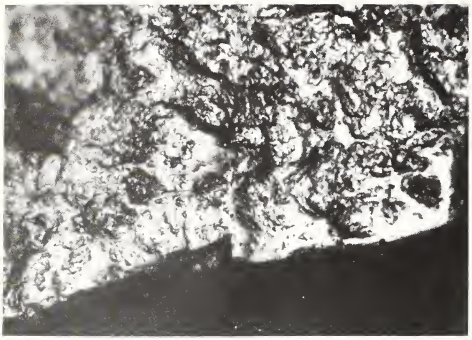

Fig. 6. Vegetal polish along the mastic coated lateral on bladelet SEH 27 K12-067, RBL/CLBRF. 200X.

large areas of the right lateral of the dorsal aspect and the entire left lateral of the ventral aspect. The bladelet was hafted along the thin, sharp low-edge angle and the stronger, higher edge angle used. Microflaking were present along the immediate edge of the right lateral on the ventral aspect; all were sharp and crisp with little 'crushing' of the edge.

Micropolish was well-developed along the immediate edges of the left dorsal lateral and right ventral lateral. It was best developed around the flake scars toward the distal end (Fig. 7). On both aspects it appeared to 'flow' from the proximal to the distal end, most probably due to prolonged 'sawing' actions. Micropolish was absent from the mastic-coated areas. Striations were generally absent.

The polish resembles that obtained experimentally from working soft plant materials, such as wood, reed and sedge. The extensive macrowear on the right ventral aspect must have occurred from pressure applied from the dorsal aspect and thus suggests that the bladelet was also used in 'whittling' activities.

SEH 42 (from L13-106, RBL/CLBRF) (Fig. 3e)

A bladelet with the bulb removed by flaking. Mastic was present along the right lateral of the dorsal aspect and the entire left lateral of the ventral aspect. The bladelet was hafted along the thin, sharp low-edge angle, and the stronger, higher edge angle used to perform the activity.

Microflaking was mainly present on the left lateral of

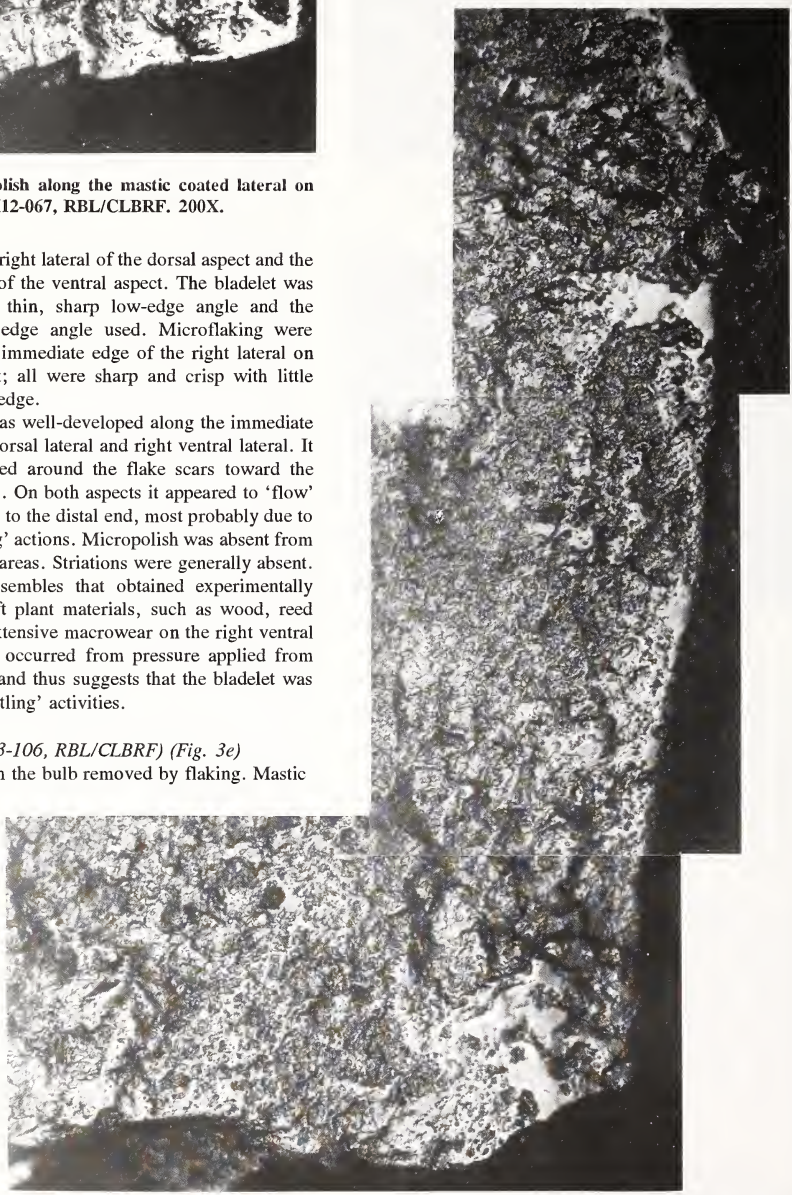

Fig. 7. Well-developed vegetal polish along the edge of a flake scar on bladelet SEH 30 J12-067, RBL/CLBRF.

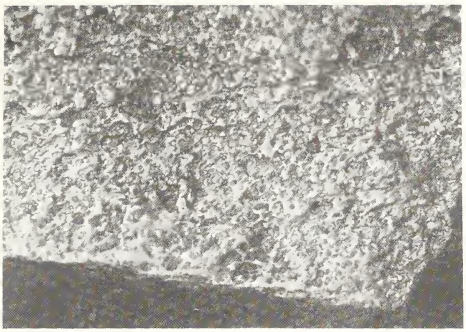

Fig. 8. Hide polish on bladelet SEH 42 L13-106, RBL/CLBRF.

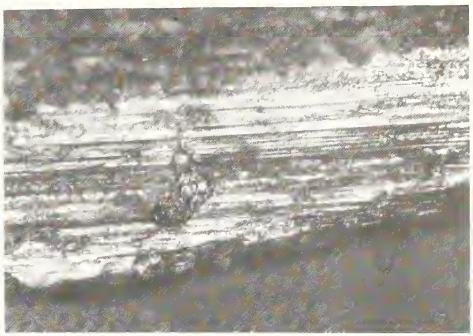

Fig. 9. 'Stone polish' on bladelet SEH 41 K13-097, RBL/CLBRF).

the dorsal aspect and on the right lateral of the ventral aspect. Interlocking flakes concentrated near the proximal and distal ends of the ventral right lateral. There was no micropolish or other usewear traces present on the mastic coated side, although a few 'bright spots' and 'streaks' did occur. A well-developed 'fine' micropolish oriented parallel to the working edge was present on both aspects; dorsal left and ventral right (Fig. 8). Short and long, shallow U-shaped striae run parallel to the edge and minute striae were also present at varying angles. The usewear traces suggest that the bladelet was used to cut soft material, probably hide.

SEH 43 (from L13-106, RBL/CLBRF) (Fig. 3f)

A bladelet with straight laterals, small bulb of percussion and striking platform with mastic present along the entire left dorsal and right ventral laterals. Both laterals displayed interlocking flaking and 'crushing' along the immediate edges; these were concentrated toward the centre and the distal ends. A few flakes were also present along the left ventral lateral. The artefact's micro-surface was very shiny, though it is not clear what the reason for this is. Usewear polish was best developed toward the distal and proximal ends of all the laterals. Minute striae and 'streaks' run parallel and at high angles to the cutting edges. The wear traces indicate that this bladelet was turned in its mount and used on both sides, perhaps on different materials. It seems as if it was mainly used on hide, but perhaps also for a brief period on soft vegetal material. Cutting was the general activity in which the implement was employed.

SEH 41 (from K13-097, RBL/CLBRF) (Fig. 3g)

A small, narrow bladelet with straight laterals, tiny bulb of percussion and striking platform. A small patch of mastic was present near the proximal end of the right dorsal lateral, with a few specks present along the left ventral lateral. The bladelet was hafted along the thin, sharp low-edge angle and the stronger, higher edge angle was the one used to perform the activity. A few small flakes occurred near the distal end of the left dorsal lateral and the proximal end of the right ventral lateral. Two large 'breakages' were present near the distal ends of the right dorsal and the left ventral laterals and a few tiny 'breakages' were spaced along both laterals.

The right ventral lateral displayed abundant patches of 'bright spots' and 'streaks'. A concentration of 'bright streaks' and both deep and shallow V- and U-shaped striae that run parallel and at low angles to the cutting edge occurred near the distal end, indicating that the bladelet made contact with other stone and/or sand particles (Fig 9). Apart from a few tiny patches, there was no well-developed micropolish along the immediate edge to identify any organic material. It is therefore possible that this artefact was used briefly as a cutting/sawing implement on a soft material, such as meat, which usually takes a long time to produce a micropolish. Similar 'stone wear' would have been produced if the meat, or other soft material, had been cut on a stone slab.

Alternatively, it is possible that it could have formed part of a projectile, the 'stone wear' suggesting that it made contact with soil. In either case, the location of the mastic indicates that the bladelet was mounted parallel or at a very low angle to its haft. A large patch of micropolish on the ridge of a flake scar near the proximal end of the left dorsal lateral is similar to that produced experimentally when working wood and does not resemble 'stone polish'. If it is wood polish, however, it is not clear how it originated, or why it is located where it is.

Summary

All the bladelets, except where the bulbs were removed, displayed tiny bulbs of percussions and striking platforms. Seven of the 14 bladelets selected for study have well-developed microwear. In all cases this results from the artefacts having been used in cutting and/or whittling activities, with the bladelets hafted along their thin, sharp low edge angle and the activities performed using the stronger, higher angled edge. Bladelets were hafted parallel to their mount, rather than as projecting barbs. Two of the bladelets were used to work hide, two to work soft vegetal materials, such as wood, reed or

sedge, and one on both kinds of materials. A further bladelet was used to work bone and/or possibly in butchering animals, while SEH 41 may either have been employed as a component of a projectile weapon or in cutting soft material. Three of the remaining seven bladelets on which micropolish was not so well-developed may have been used to work soft materials, such as hide and meat or those of plant origin.

DISCUSSION

It has always seemed likely, given their small size, that Robberg bladelets must have been hafted for them to have been used. The Sehonghong examples are unique because they are the first to have been discovered that still retain traces of mastic. Examination of its distribution on the full sample of 39 mastic-stained bladelets from Sehonghong, in conjunction with the microwear results reported here, indicate that they were hafted parallel to their handles or shafts (see Phillipson 1976). Though it is not possible to be certain of this on presently available evidence, their small size suggests that several bladelets were probably hafted in sequence to produce a longer cutting edge in a manner similar to that of the Australian taap-sawknife (Mulvaney 1969). Binneman (1982:266) has previously suggested that at least some backed bladelets from the Holocene levels at Boomplaas Cave in the Western Cape Province may have mounted and used in this way.

The complete absence of bone hafts from late Pleistocene assemblages, even where, as at Sehonghong, faunal remains and worked bone are well preserved, indicates that wooden hafts must have been used (Mitchell 1988a). Deacon (1976:59) has reported the presence of such slotted wooden handles in mid-Holocene contexts at Melkhoutboom in the Eastern Cape Province. Although only one lateral edge was used on most of the bladelets examined in this study, one bladelet (SEH 43) had been turned in its mount and used on two different materials.

The wide range of materials on which the Sehonghong bladelets were used (soft plant materials, hide, bone and possibly meat) is paralleled by results recently obtained in an analysis of Robberg bladelets from the approximately contemporary site of Rose Cottage Cave in the eastern Free State (Binneman 1997 in press). There too Robberg bladelets seem to have been principally employed in cutting hide and soft plant materials, some of which it may be possible to identify more specifically from ongoing residue analyses (Williamson 1996).

Given the scarcity of other deliberately designed artefacts in Robberg assemblages a comparable variety of functions for Robberg bladelets could have been anticipated, although most previous authors have selectively emphasised their possible role in hunting weaponry. Microwear analysis of Robberg bladelets from Rose Cottage and Sehonghong thus dovetails with recent critiques of the pre-eminent role previously accorded large ungulates in Robberg subsistence strategies (Mitchell 1988; Deacon 1995) and of the very idea of a single hunting-dominated lifeway in late Pleistocene southern Africa (Mitchell 1996c).

Sehonghong is one of the few late Pleistocene sites at which plant remains are preserved. Preliminary analysis of samples taken from the 1992 excavation indicates, somewhat surprisingly, that geophytic plant foods are absent in the late Robberg layers, at least in the small area excavated (G. Hall, pers. comm.). However, grasses are relatively common and were probably introduced as bedding material. It is possible that at least some of the plant use wear noted on the bladelets discussed here results from cutting and collecting this material.

Only one of the Sehonghong bladelets (SEH 2) has usewear consistent with the possibility that it formed part of a projectile weapon. While it remains possible that at least some of the many bladelets found in Robberg assemblages were used as components of hunting weapons, it is not supported by the small samples examined from Sehonghong and Rose Cottage Cave. Larger samples still need to be examined to confirm this observation.

Only a fraction of the bladelets from the late Robberg levels at Sehonghong, 23 of the 39 (59%) mastic-stained bladelets, were classified as utilised on the basis of macroscopically visible edge damage. SEH 12, which from a typological standpoint was considered to be unmodified, was shown by microwear analysis to have been used to work bone and/or to butcher meat. There is nothing new in the realisation that typological analyses grossly underestimate the number of artefacts that, far from being 'waste' or 'debitage', were in fact employed in a variety of tasks (cf. Phillipson & Phillipson 1970; Binneman 1982), but it is important to stress this point when considering the Robberg.

The implication is that many of these artefacts were used in a manner that was insufficiently prolonged or intensive to affect their gross morphology. That only one of the bladelets examined in this study appears to have been remounted and used in more than one activity supports the idea that many, perhaps most, Robberg bladelets were employed as relatively short-lived, single task tools, rather than being recycled and curated over the longer term. The modern analogy lies perhaps more with disposable razor blades than with pocket knives.

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REPORTS

REPORT ON FINDS AT THE VICTORIA AND ALFRED WATERFRONT, CAPE TOWN, BETWEEN 1990-1993*

G. ABRAHAMS-WILLIS

Department of Archaeology,
South African Cultural History Museum,
P.O. Box 645, Cape Town 8000

*Accepted for publication April 1997

The Department of Archaeology at the South African Cultural History Museum was invited by the Victoria and Alfred (V&A) Waterfront Company to act as consultants on archaeological remains uncovered during developments on the site between 1990-1993 (MLH Architects and Planners 1989, 1990a, 1990b) (Fig. 1). Research excavations were not undertaken, save for the documentation of features exposed (Fig. 1a, 1b, 1c, 1d) (Abrahams 1995), the salvage of scattered artefacts and work undertaken by the University of Cape Town on the Portswood Precinct and at the Amsterdam Battery (Seeman 1989, 1993; Hall 1991; Archaeology Contracts Office 1992).

A small feature, its function unknown, was uncovered

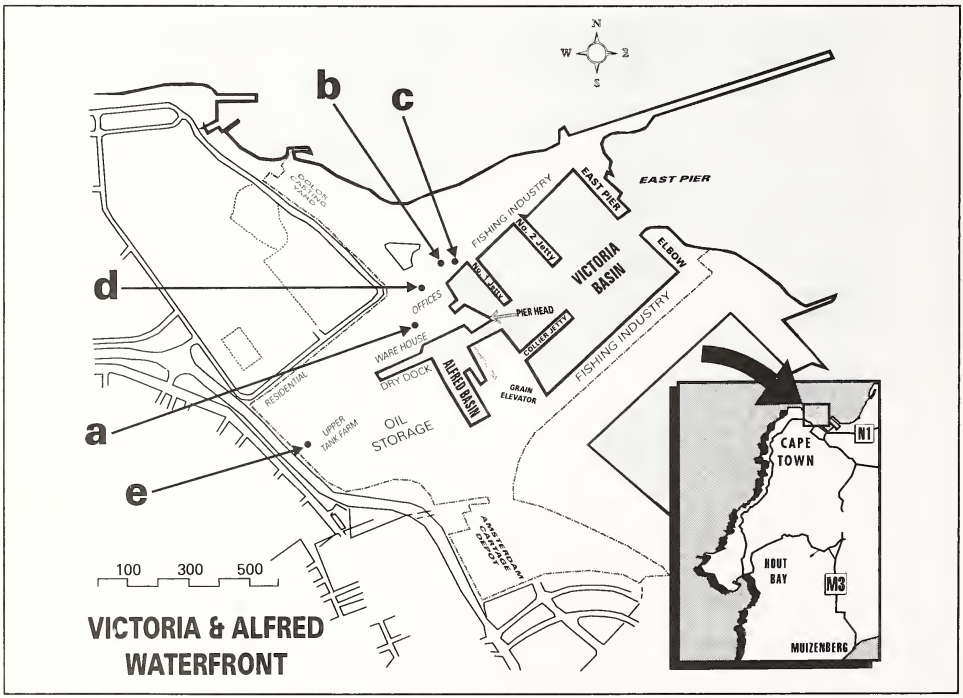

Fig. 1. Location map of the Victoria and Alfred Waterfront with particular sites marked. (Drawing by Linda Coetzee).

Fig. 2. Photographs depicting the feature uncovered in front of the Information Centre.

Fig. 3. Photographs of the jetty which was located under the present Victoria Wharf. Note the cobbles which form a platform under the jetty and the riveted iron boxes next to which are concrete blocks in places.

in the area opposite the present Information Centre (Figs 1a, 2). No associated artefacts were found with this fountain or ornamental-type feature and the area was largely disturbed by previous and contemporary pipe and cable-laying activities.

Until the mid-1860s, no harbour of refuge existed at the Cape (Peterson 1978:1980). Port facilities were primitive consisting mostly of wooden jetties, except for a stone jetty started at the bottom of Bree Street in 1832, which was, however, never completed. During the winter months, northerly gales from the Atlantic played havoc among ships in the bay. One such recorded incident occurred on 17 May 1865 when fifteen vessels were wrecked during a fierce gale in Table Bay (Cape Town Directory for 1866; Theal 1919; Kennedy 1955; Burman 1976; Rawe & Crabtree 1978; Turner 1988). Table Bay remained out of bounds to ships for approximately half of the year, until the Table Bay Harbour was developed (Bickford-Smith, Qotole, Heyningen & Sittert 1994; Veitch 1994). This harbour of refuge was a project without equal in the Southern Hemisphere. However, at about the same time, at the opposite end of the African continent, another major marine engineering construction programme had started, namely, the Suez Canal. Despite

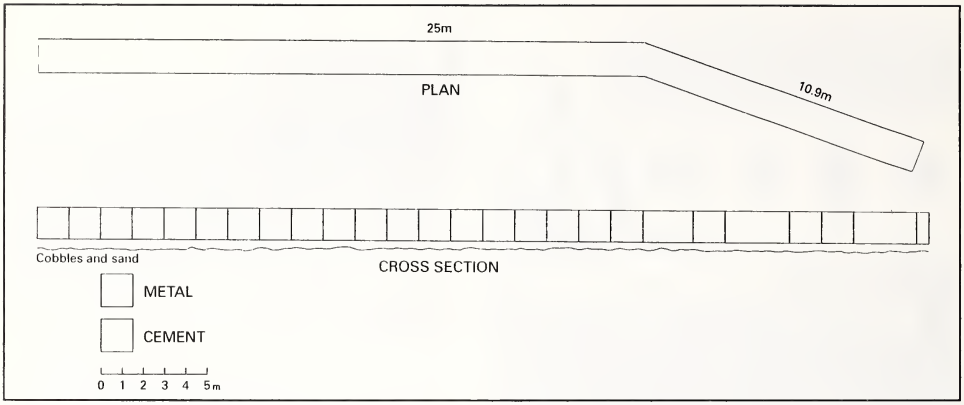

Fig. 4. Measured drawing of the iron jetty, done by Heinrich Mostert and Leon Kotze on 27 September 1990.

this threat to the maritime traffic around the Cape, effectively reducing the sea route passage from Europe to the East by nearly 10 000 km, the Table Bay Harbour plans continued. As part of the British Empire, immense pressure was placed on the strategic and commercial importance of Table Bay. Into the new century, more steamship lines, navigation companies and passenger liners used Table Bay Harbour and new plans, extentions and improvements continued to keep pace with the new demand in world shipping.

During developments by the V&A Waterfront Company between 6-21 September 1990, an iron jetty and a breakwater feature were located in the area forming the present basement parking of the Victoria Wharf Retail and Development Centre (Fig. 1b, 1c). This site was once part of the early Dockland Development and, according to maps of the area (Cape Town City Council, Land Survey Branch Map dated c. 1884; Cape Archives M1/2454; Regional Engineer of Harbours, Table Bay Historical Development Plan 1985), this section was developed sometime between 1870-1920, both features pre-dating at the least around 1885. The jetty was constructed on a base of stones/cobbles which formed a platform on which iron boxes filled with stones and cement were placed (Fig. 3). Figure 4 is a measured drawing of this feature. The iron boxes themselves were riveted and in certain places where the iron boxes were missing, the gaps of equal size were filled with concrete contained on the outside by planks nailed across the boxes. In the vicinity, hundreds of artefacts were salvaged (Fig. 5).

The artefacts are mostly dated to the 19th and early 20th centuries and many of them bear evidence of the passenger liners and other shipping lines which frequented the Cape Town docks at these times. They consist of everyday objects such as plates, bowls, cups, saucers, tooth paste pots, drinking glasses, tumblers and medicine bottles which would have been used on board any ship as well as on land. The quack medicine bottles were common items of the time with the names of mixtures such as the "World Famed Blood Mixture" and the "Fellows Syrup of Hypophosphites" embossed on the bottles. The ceramics are mostly typical of the popular British export ceramics of the time, but certain of the specimens were specifically marked with the shipping line names *e.g.*, Castle Packets, Union Steam Ship Company, Union-Castle Line, D.O.A...Hamburg, British India Steamers, etc.

The breakwater feature was uncovered in close proximity to the jetty (Fig. 1c). It was constructed with what appeared to be quarried stone mixed with clay contained, at one end, with cast concrete barrels (Fig. 6). A short distance away, there was a small island in the road (Fig. 1d) which had a plaque marking the site of the original breakwater. It read,

> At this point H.R.H. Prince Alfred tipped the first truck of stone for the breakwater on the 17th of September 1860.

The area between the breakwater feature and the jetty was filled with quarried stone and yellow clay, cobbles and rubble. The fill contained artefacts dating mostly from the latter part of the 19th century onwards, the period post-dating the construction of the original breakwater. The indications are that like the jetty, this was part of the docklands development which took place after 1870, but before 1884, alongside the original breakwater of 1860 (Regional Engineer of Harbours, Table Bay Historical Development Plan 1985).

The ruins of an oven and surrounding washing troughs were inspected in what used to be the Upper Tank Farm region or the Oil Storage area (Fig. 1e). The oven and surrounds featured in an article written by Andrew Brown, published by the Cape Times in January 1992 (Appendix A). The oven, troughs and foundations were fully documented (Figs 7, 8, 9). An appeal made to the V&A Company to preserve these features, was turned

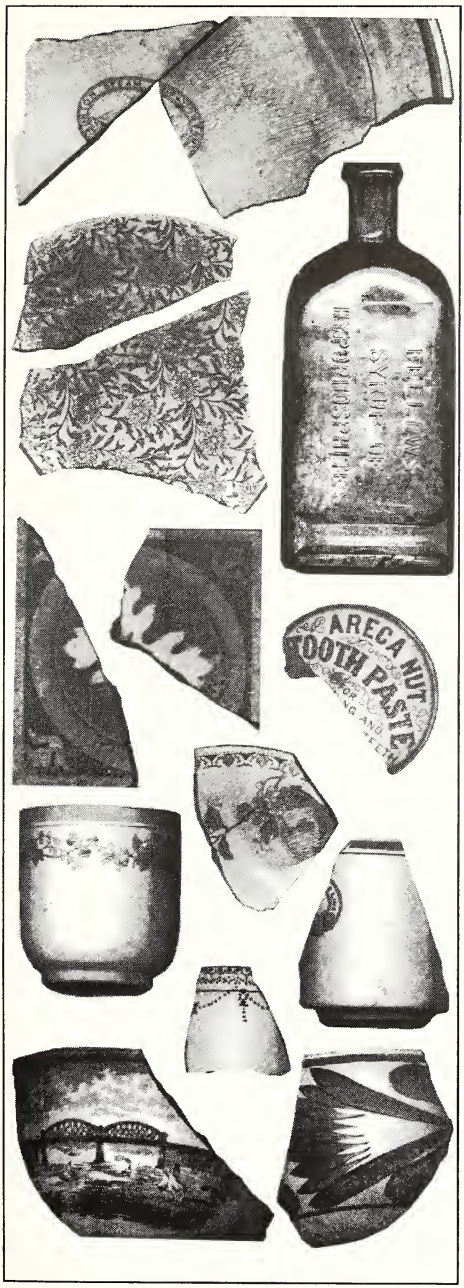

Fig. 5. A random selection of artefacts of the 19th and 20th centuries uncovered in the vicinity of the present Victoria Wharf before it was constructed.

Fig. 6. Photograph depicting A part of the breakwater feature, constructed in one section of concrete barrels and filled with stone and yellow clay at the other end.

down. This was met with great disappointment considering that this was the site of an early camp or "location" built for the dock labourers around 1901.

The harbour was mainly built with convict labour, but systems of migrant and immigrant labour become established (Saunders & Phillips 1980; Bickford-Smith *et al.* 1994). Apart from those mentioned in the discussion to follow, Portuguese, Indians, Greeks and local labourers were employed at the docks. The Cape Harbour Board kept records which are preserved in the Cape Archives and these are a rich source of information on the history of dockyard labour at the Cape. They show how labourers were viewed, enforced regulations, their living conditions, how they were treated and controlled. Convicts were housed in the Breakwater Convict Station, Irish workers in a warehouse on the East Quay referred to as the "Coolie Barracks" and Mozambicans in an old coal warehouse, later in a wood store as well as stables in Hope Street, and Mfengu contract workers in the "Coolie Barracks". In 1901 the Harbour Board decided to build a "Location" for African workers who included Nqika, Gcaleka and Mfengu people. This was situated below Portswood Ridge. Accommodation was cramped. Christian services were

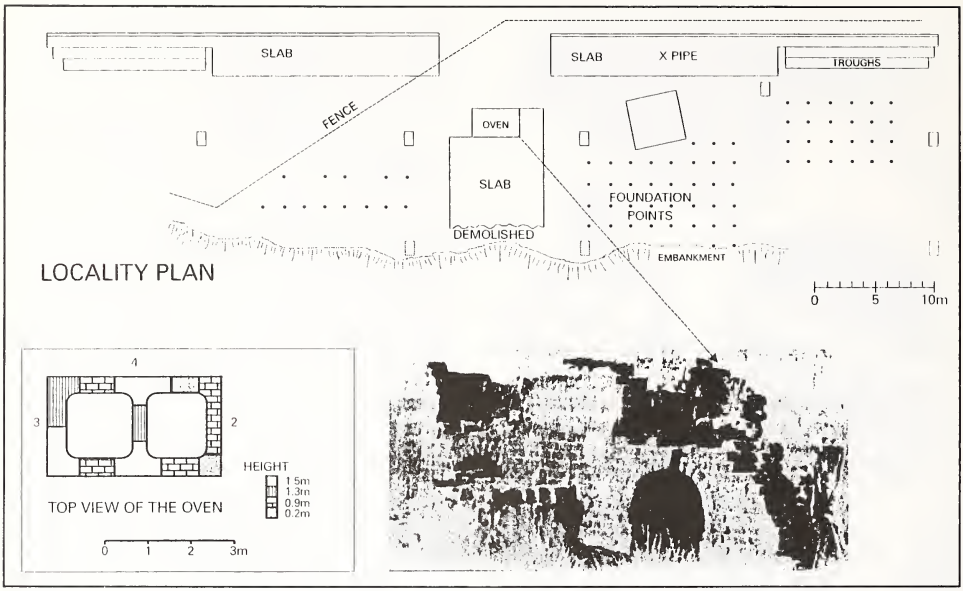

Fig. 7. The oven, troughs and foundation points, measured and drawn on 27 September 1990 by Heinrich Mostert and Leon Kotze. The scanned impression is a close-up view of the oven.

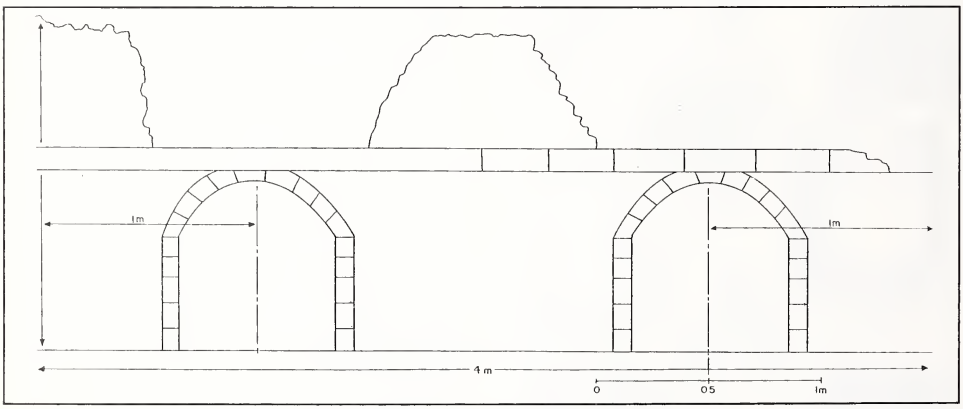

Fig. 8. Front elevation of the oven, measured and drawn on 27 September 1990 by Heinrich Mostert and Leon Kotze.

held, there was little entertainment, but music-making and dancing was often overheard. One such reported song spoke of "...the hard life of natives in Cape Town, banished from home and comfort, and compelled to eat calves' heads and such poor food..." (Bickford-Smith *et al.* 1994:46). Cricket was played, but an application by the Location Superintendent for African workers to use the Green Point Common, was turned down.

The location inhabitants were assisted by Alfred Mangena in their protests and resistance about their living conditions and their conditions of employment (Bickford-Smith *et al.* 1994). Mangena was a young man who was saving up to study to become a barrister in London. He wrote to the newspapers and explained the sensitivities of "Natives" and, on his return to South Africa from England, became a founder member of the South African Native National Congress of 1912 which became the African National Congress (ANC) in 1923.

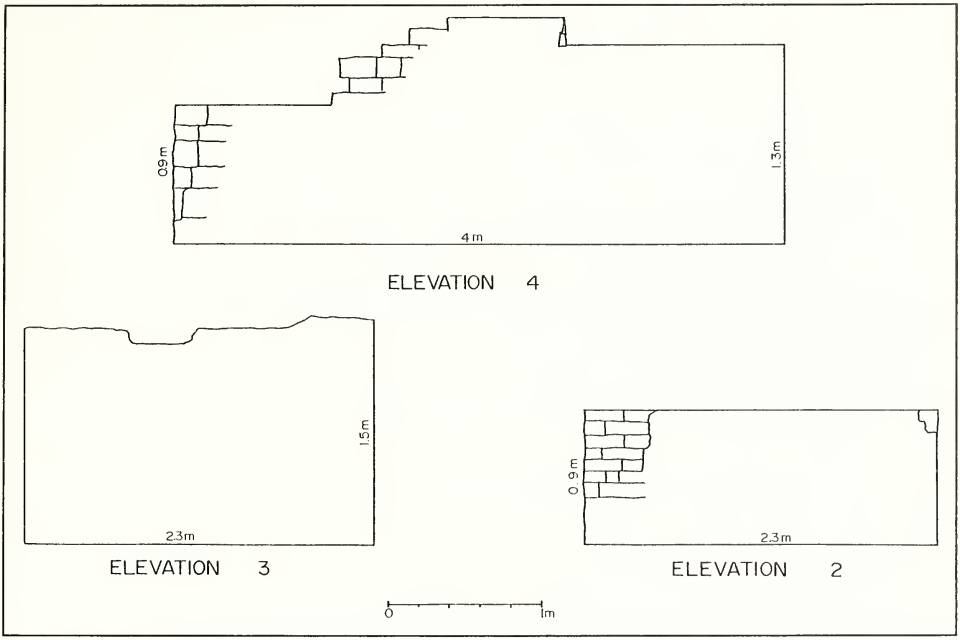

Fig. 9. Rear and side elevations of the oven, measured and drawn on 27 September 1990 by Heinrich Mostert and Leon Kotze.

In 1919 Cape Town dock workers started joining one of the largest labour organizations in Sub-Saharan Africa, namely, the Industrial and Commercial Workers Union (ICU), led by Clements Kadalie. From this stage, Union support in the dockyard labourers' rights was initiated.

The sites of preservation, the social history of the labourers and the paramount importance of their contribution to the development of the docks, is a field of research which has received very little attention. This, no doubt, requires urgent remedy so that the labour force responsible for our first harbour of safety can take their rightful place in the history of the dockland developments at the Cape.

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Thanks to David Jack, Director of the V&A Company, for inviting us to participate in the project. We are grateful to Andrew Brown for pointing out the oven and Neil Schwartz at MLH Architects and Planners for arranging with Heinrich Mostert and Leon Kotze to do the measured drawings. Linda Coetzee assisted in preparing the illustrative material for this article. Thanks to Ian Black for supplying information on the maps in the Land Survey Branch of the City Engineers Department.

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Southern African Field Archaeology: ambj@warthog.ru.ac.za
Johan Binneman: amjb@giraffe.ru.ac.za
Lita Webley: amlw@warthog.ru.ac.za

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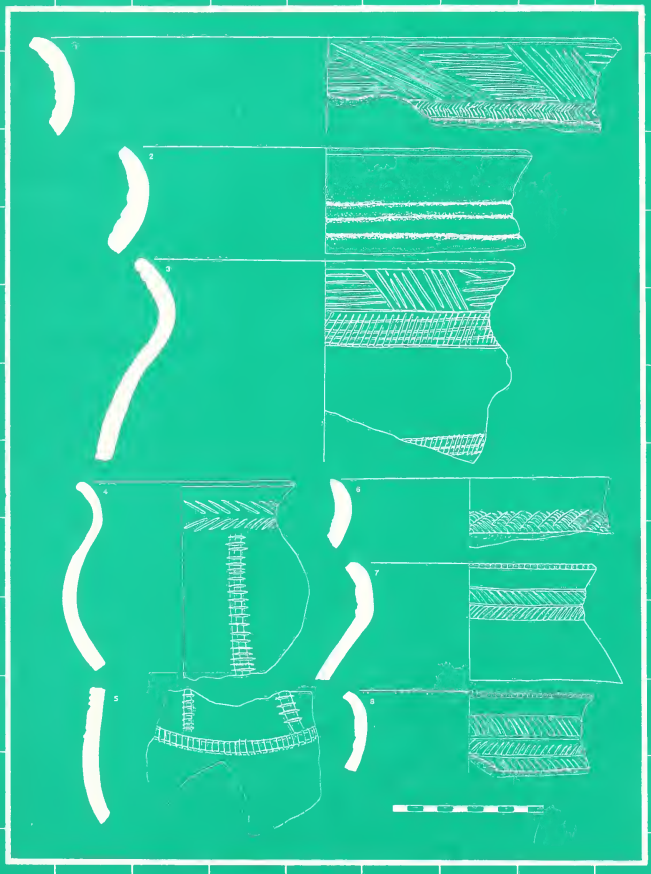

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Cover illustration:
Some of the Early Iron Age decorated ceramic vessels found during the excavations at Ndondondwane, p. 61.

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OPINIONS

TRANSLATING ARCHAEOLOGY

The future of archaeology and the communication of archaeological knowledge to society at large have become dominant concerns for archaeologists in many parts of the world, particularly in southern Africa (*e.g.*, Summers 1967; Inskeep 1970; Humphreys 1972; Deacon 1988; Binneman & Webley 1992; Lewis-Williams 1993; African Archaeological Review 1996:5-34; Kusimba 1996; Binneman 1997; Ouzman 1997). In southern Africa, initiatives in archaeology have and are being undertaken by the Universities of Botswana, Cape Town, Pretoria, South Africa, the Witwatersrand and Zimbabwe and also by those museums at which archaeologists are based. Public archaeology is based on the premise that:

> Research into the past is not, in itself, sufficient; there must be communication, and communication must not be limited, as it tends to be at present, to exchanges between those involved in the task of unravelling the past. It must be extended both to the student and to the public at large, and this may require two, or three quite different kinds of literature (Inskeep 1970:302).

Yet, despite some success in public archaeology - certainly, some forms of archaeology such as rock art have always had a robust public profile and participation - the prevailing mood among southern African archaeologists is pessimistic. For example, Lizeka Mda's statement that "our advances in archaeology are not widely known beyond the National Geographic Society, as there is no vehicle through which we can blow our own horns" (1997:35) and the recent closure of the University of Stellenbosch's Archaeology Department suggests that, at best, mainstream society regards archaeology as a redundant and indulgent pursuit and, at worst, ignores or is entirely unaware of the discipline. This has prompted some thoughts on the "ongoing debate in some quarters on the position and role of archaeology in South African society" (Mazel 1991:59).

Ngaba-Waye succinctly captures the essence of public archaeology when he states that "Archaeology must seek to grasp current phenomena by their roots" (1996:26). Often the search for 'roots' is literal and involves excavation - a necessary though destructive and deeply problematic technique (*e.g.*, Loubser 1990:72; Solomon & Smith 1994:62; Hodder 1997). Far more important than excavation is the intellectual search for 'roots' through the contemplation of archaeological material culture or 'artefacts'; not all of which are obtained through excavation. The artefacts of the archaeological gaze vary tremendously: from extensive landscape studies, to intensive analysis of trace elements, to considerations of ethnographic evidence. In an otherwise hyper-diverse discipline, it is the contemplation of artefacts in a broad sense that unites all archaeologists. For the archaeological contemplation of artefacts to be socially meaningful at least two episodes of translation are required. First, archaeologists have to translate artefacts into contemporary idiom, usually text. Secondly, these textual renderings have to be translated into popular, usually visual, idiom. I discuss each translation in turn.

Archaeology and text

The archaeological translation of artefacts operates on many levels and involves many principles (*e.g.*, Wylie 1989). Typically, we translate artefacts by means of metonymy and mimesis (*e.g.*, Kirshenblatt-Gimblett 1991; Hodder 1993), processes by which we understand the artefact to embody or encode the essence of a larger, usually no longer present reality which, in turn, provides the artefact with temporal, spatial and interpretive contexts. In other words, the archaeological artefact is somewhat contradictorily understood to be both a fragment as well as a quintessence of a larger whole. However, the archaeological translation of artefacts is undermined by the archaeologist almost always being an outsider to the whole being studied. "It will always be difficult to write the history of people who did not write the sources, and whose world-view and epistemology was fundamentally different from those of the writers of the sources" (Abrahams 1995:34). The archaeological translation of artefacts is further undermined, at least in Africa, by the use of text which is often experienced as an artificial and even colonial phenomenon that has no convincing link to the past and its artefacts (*e.g.*, Mamdani 1996; see also Valdés 1992). Rather, artefacts are apprehended visually and viscerally and much of their power lies in the difficulty of rendering artefacts textually. Yet most archaeologists, myself included, tend to be textually oriented as a result of years of study, reading, writing and arguing.

Archaeology and the visual

Fortunately, there is a move towards visual literacy which is a far more appropriate means of communication than text, particularly in a region such as ours where words rapidly alter, jargon abounds and many people cannot read. Translation of the textual to the visual requires that archaeologists enter into partnerships with 'idiom translators' such as children, graphic artists, teachers, visual anthropologists and so forth (see Miller 1993:58; Wahl 1996) and "films, theatrical performances, and audiovisual media are among the means to be explored in the future for the dissemination of archaeological knowledge" (Ngaba-Waye 1996:27). For example, the partnership between archaeologists, educationists and students has ensured that South Africa's new History textbooks have a prominent visual and open-ended interpretive component (e.g., Clacherty & Ludlow 1995). It is this visual-associative logic, rather than textual-ascriptive logic, that has the widest appeal and which most fully communicates the meanings of artefacts.

An important part of the visual translation and communication of archaeological knowledge is the example archaeologists set in the manner in which they introduce archaeological artefacts into the public domain. For example, the display of the Linton painted fragment in the 'Africa: the art of a continent' exhibition (4th October 1995 - 21st January 1996), was both good and bad public archaeology. Though the exhibition was not staged on African soil, the detailed and interrelated paintings on the Linton fragment effectively promoted southern Africa's rock art heritage to the world - but at a price. As part of exhibition procedure, the Linton painted fragment was insured for over a million rand. Instead of being price-less (without price), the Linton painted fragment was, unintentionally, given a cash value by an archaeological-museological community, thereby transforming it from an artefact into a commodity which is, by definition, implicated in a market economy. This transformation has potentially disastrous consequences for thousands of unprotected African rock art sites.

Despite such problems, visual translations of artefacts are, in fact, numerous and exist in both embedded and dis-embedded forms.

Those sites and artefacts that have suffered minimal human and natural intervention and which appear 'pristine' represent embedded forms of archaeology. Some of these locales have been developed as site museums, which are enhanced by textual, visual and even aural information. The effectiveness of the embedded form of archaeology lies in the undeniable authenticity of the site and its artefacts; a status that is frequently underscored by the participation of a vocational archaeologist.

Dis-embedded forms of archaeology typically consist of either authentic artefacts wrested from their original contexts or facsimile reproductions of artefacts, both of which are displayed in constructed locales such as art galleries, books, museums, web sites, and such like. The dis-embedded form of archaeology often attempts to mimic the embedded form by means of body casts, dioramas, muted lighting, reproduction rock shelters and so on. People are, however, seldom fooled by these attempts at verisimilitude and have developed alternative translations of artefacts and the past.

For example, a vigorous form of dis-embedded archaeology is already present in mainstream society in the form of innumerable reproductions of artefacts - especially rock art imagery - in advertisements, artworks,

books and films and on clothing, curios, posters and other objects (*e.g.*, Dowson 1996). The placement of these facsimile artefacts in the public domain often galls archaeologists who no longer have the dominant voice and who are no longer the sole custodians of the past's mirablia. We now have to compete with advertising agencies, authors, business, filmmakers, tourists and the lunatic but popular fringe for control over how artefacts are understood and translated. In fact, we have to compete with every South African; after all, the "the consumers [of archaeological knowledge] are people who, through their taxes, contribute to the production of archaeological knowledge. They therefore have a stake in archaeology" (Lewis-Williams 1993:45). Some dis-embedded translations of archaeological artefacts are insensitive, some are informed by archaeological research while still others, such as the National Olympic Committee of South Africa's 1996 'rock art' logo, are a mixture of commercialism and 'nation-building'. This last-mentioned manifestation is ironic. We can only use San rock art as a non-sectarian symbol because the 'Khoisan' have, until recently, been unable to articulate an identity and voice with which to claim, defend and use their symbols and heritage (but see Pietersen 1996; Barnard 1997).

The archaeology of tomorrow and the day after

In an increasingly bland and derivative world (*e.g.*, Eco 1986:133-159), people are experiencing the need to formulate and express distinctive identities, which are accompanied by similarly distinctive objects and symbols. Archaeological sites and artefacts, with their authenticity, antiquity and frequent uniqueness, have an important, concept-forming role to play in the construction of local and national consciousnesses and histories (*e.g.*, Appadurai 1981; see also Barnard 1997). In a southern African context we must, however, guard against replacing divisive Apartheid-era concepts with inclusive Rainbow nation-era concepts. It is not at all certain that "we need to develop approaches to the past that will contribute to the formation of concepts that will promote unity" (Lewis-Williams 1993:46); rather we need to produce 'honest' and diverse research and visual displays that convey the fragmentary nature of the past, our similarly fragmentary understanding of it and the fractious nature of contemporary society. "South Africa may be ethnically diverse, but it is far from tolerant. We simply do not have a history of pride in our cultural diversity. We do not have enough self-confidence to boast of anything" (Mda 1997:35). Mda may be overly pessimistic: isn't the 'rock art' T-shirt a translation, display and boast of our archaeological heritage?

The chain of translation from artefact-text-visual has many participants and strong as well as weak links. The problems we face are not limited to Africa and we can turn to the resources offered by trans-nationalism and globalization (e.g., Lyotard 1984; During 1997). Yet it would be a mistake to uncritically embrace globalization, as the local is often more immediate and important than the global:

> Research should, as much as possible, be relevant and easily translatable to local needs in order to gain support and understanding of the local communities in whose domain such projects are undertaken. As a consequence, these communities become guardians of archaeological sites rather than mere neighbors (sic) (Kusimba 1996:169).

In this way, partnerships between archaeologists and communities are transacted in which the artefact and even the archaeological site have multiple owners and custodians. Indeed, some individuals and communities have been actively using 'other' people's archaeological sites and artefacts for their own purposes for some time (*e.g.*, Ouzman 1995). At a practical level, the repatriation, display and custodianship of artefacts acquired from both research and salvage archaeology may help alleviate the problems of inadequate storage facilities and poor conservation practices (*e.g.*, Loubser 1990), lack or absence of funds and trained staff (*e.g.*, Kibunjia 1997), the illicit trade in cultural property (*e.g.*, Mvenge 1996) and so on.

Southern African archaeology as viewed from the inside appears socially sensitive and aware of its deficiencies and "when it comes to terms with such deficiencies, and this is by no means impossible, we can expect [a] new and greater understanding of a rich and varied past" (Garlake 1995:37). On the other hand, "the decade between Nelson Mandela's release from prison and his appearance on the podium as Patron of the Fourth World Archaeological Congress might witness the cruellest period of change in the discipline of archaeology" (Hall 1997:vi). Re-placing artefacts from the past into the public domain "is an attempt to reach into the unknown - both past and future. But it is a journey that may be impossible - indicated by the death in the desert of the archaeologist, who died chasing a chimera, a mirage, an unknowable archetypal symbol. His body was found by the others, his mission unaccomplished" (Tomaselli 1993:87).

Sven Ouzman
Rock Art Department
National Museum
Bloemfontein

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THE EARLY IRON AGE SITE OF NDONDONDWANE, KWAZULU-NATAL, SOUTH AFRICA: PRELIMINARY REPORT ON THE 1995 EXCAVATIONS*

LEN O. VAN SCHALKWYK

KwaZulu Monuments Council
Ulundi, South Africa

and

HASKEL GREENFIELD & TINA JONGSMA

Department of Anthropology, Fletcher Argue 435,
University of Manitoba, Winnipeg,
MB, R3T 5V5, Canada

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ABSTRACT

Large-scale horizontal excavations of the Early Iron Age (EIA) Ndondondwane-phase type site in the Thukela valley of KwaZulu-Natal (South Africa) were re-opened in 1995 in an attempt to increase our understanding of the intra-settlement economic and social organization of the EIA communities in southern Africa. Previous excavations of the EIA site of Ndondondwane indicated that it would be a prime candidate for such a research project. The site is largely undisturbed, has an extremely short occupation, and the deposits are close to the surface facilitating excavation of large areas of the site. The ensuing report places the resulting archaeological field work on the site of Ndondondwane in historical context, describes the fieldwork undertaken previously and during 1995 at the site, and presents the collected data necessary to begin testing the various models of EIA intra-community spatial structure.

INTRODUCTION

The appearance of food producing communities in eastern southern Africa occurs concomitantly with the introduction of iron metallurgy. In southern Africa, most EIA research has focused upon defining the culture historic sequence of EIA communities in the region. As a result, the general outline of the material culture sequence has been defined. However, relatively little effort has been expended until recently to reconstruct EIA social and economic organization. Various often contradictory models have been proposed to explain the nature of EIA community organization. Hall (1987) argues that EIA communities were organized at a household or domestic level of production, while Huffman (1993), Denbow (1984), and others have argued for more community-wide modes of production (such as the Central Cattle Pattern [*cf.* Kuper 1982]). However, the internal economic and social organization of EIA settlements and households remains inadequately understood (*cf.* Van Schalkwyk 1992; Whitelaw 1994b).

The Lower Thukela River basin, KwaZulu-Natal Province, South Africa (Fig. 1), is an appropriate region for the testing of such models because research to date in the area has yielded one of the most comprehensively defined regional EIA culture historic sequences. The EIA ceramic sub-phasing is anchored by radiocarbon dates and has a very narrow temporal range (100-150 years), allowing strict control over temporal variability within the region. This level of control is available in only a few other areas of the subcontinent. Regional survey has defined the larger EIA settlement system (Van Schalkwyk 1992, 1994a, 1994b, 1995) allowing preliminary evaluation of the position and representativeness of sites within the area.

The goal of the Ndondondwane research was to increase our understanding of the intra-settlement economic and social organization of the EIA communities in southern Africa. In order to effectively carry out this goal, we needed a site with a largely undisturbed and extremely short occupation, but where the deposits were close to the surface to facilitate excavation of large areas of the site. Investigations of intra-settlement community organization should ideally be conducted on single phase-single occupation sites in order to minimize the effects of temporal and spatial change (limiting settlement

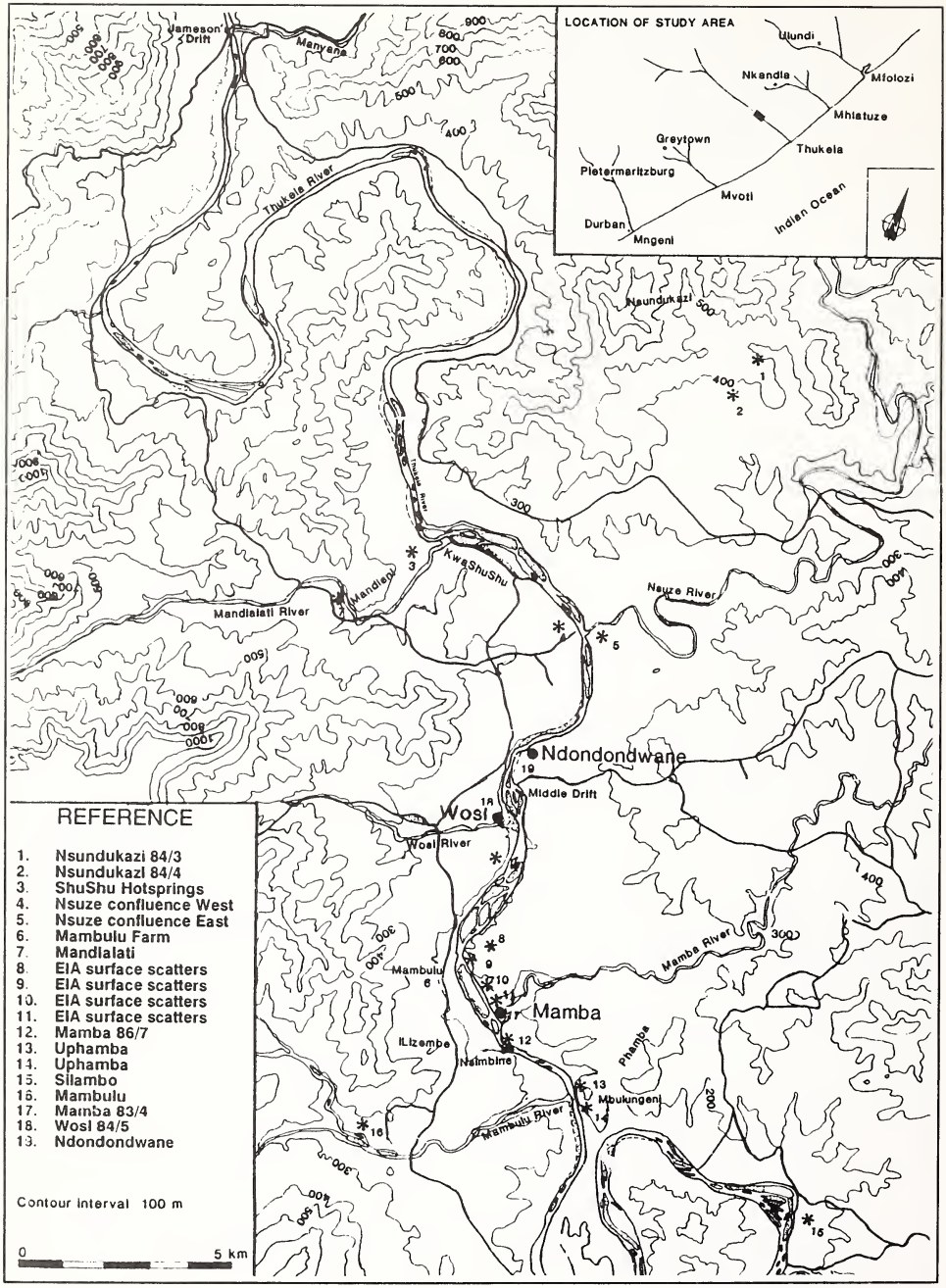

Fig. 1. Map of Lower Thukela basin survey area and locations of Early Iron Age sites. Inset is location of study area in relation to major rivers and urban centres in KwaZulu Natal.

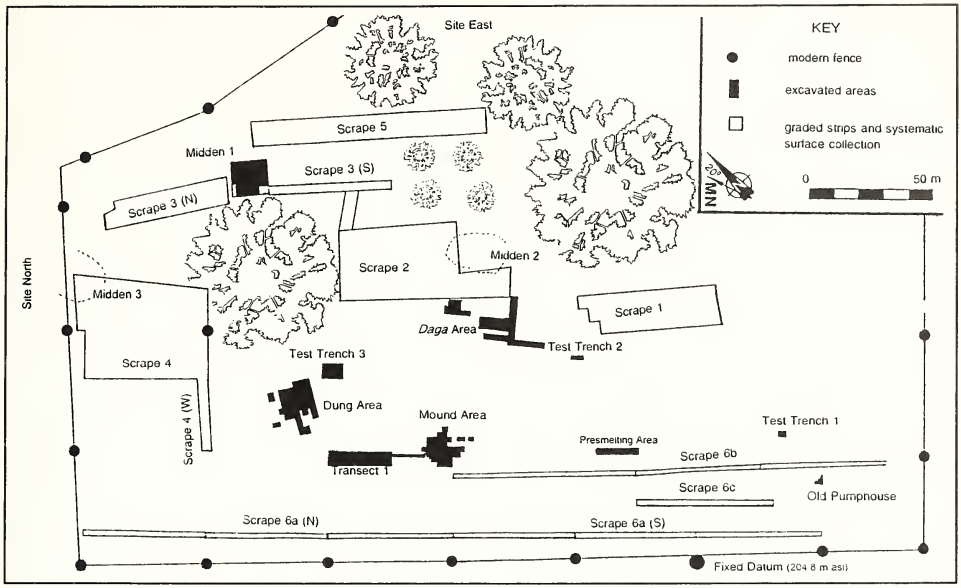

Fig. 2. Preliminary site plan of Ndondondwane, showing old and new excavation areas and scrapes.

drift). Previous excavations at Ndondondwane indicated that it would be a prime candidate for such a research project (Maggs 1984a; Loubser 1993). As a result, new large-scale multi-year excavation at Ndondondwane were planned. The first of these seasons occurred during the winter of 1995 by a joint team of Canadian and South African archaeologists to collect data to test models of EIA intra-community spatial structure. The ensuing report places the resulting archaeological field work on the site historical context, describes the fieldwork undertaken in 1995, and, on the basis of the archaeological finds, argues their cultural heritage significance.

PREVIOUS RESEARCH

As early as the 1930's, archaeological deposits with extensive iron working residues had been recorded at Hot Springs (Shu Shu), and at the Nsuze, Wosi and Mamba tributary junctions on the Thukela (Laidler 1938) (Fig. 1). These were ascribed to Bantu-speaking populations resident in the region between the late 16th and early 19th Centuries (Schofield 1948:158-162). For the next thirty years, within a socio-political milieu that continued to reinforce the myth of a concomitant arrival of Blacks and Europeans in the sub-continent in the 15th Century, and one in which the former were denied any active participation in their own history, the dates and cultural affiliation ascribed to these sites remained unchallenged.

However, by the early 1970's, archaeologists had begun to contest the orthodox portrayal of Black African's origins. In a seminal Early Iron Age (EIA) research program in the KwaZulu-Natal region, Tim Maggs of the Natal Museum redefined the region's culture-historic sequence and was able to demonstrate a far greater antiquity for these and other related sites along the eastern seaboard (Maggs 1973, 1976, 1980a, 1980b, 1984a, 1984b, 1984c; Maggs & Ward 1984). On the basis of a series of confirmed radiocarbon dates, he firmly placed these Thukela basin sites within the first millennium AD.

The 1978 excavations

In 1978, the then owner of the Middle Drift trading store, Campbell Willmore, notified the Natal Museum of the presence of enigmatic clay mask and other ceramic fragments in a ploughed field adjacent to the Ndondondwane ford over the Thukela (Fig. 2). Maggs investigated the site and chose to excavate on what subsequently came to be recognized as a large mound or midden deposit of cultural debris, apparently associated with a variety of activities. These included iron smelting, ivory working, and ritual practices that were inferred by the excavator from the presence of further clay mask fragments reminiscent of the now famed Lydenburg Heads (Innskeep & Maggs 1976; Maggs & Davison 1980).

Maggs was primarily concerned with ceramic data from which he could build on his ceramically-seriated and radiocarbon-anchored culture historic sequence. He was further, clearly able to demonstrate that the ceramics

from the site comprised a new phase within the EIA sequence (*c.* AD 300-1100) that he had begun to map in the KwaZulu-Natal region (Maggs 1973; Maggs & Michael 1976). Ndondondwane thus became the type-site for the phase and by convention was named after it (Maggs 1984a). The site was subsequently dated by radiocarbon dating to *c.* AD 750 (Maggs 1984a:78). Within the regional ceramic sequence, the Ndondondwane phase postdates the *ca.* AD 500-700 Msuluzi phase (Maggs 1980b) and predates the later *ca.* AD 900-1100 AD Ntshekane phase (Maggs & Michael 1976).

Due to funding and personnel constraints (Maggs was one of only two archaeologists employed in the province at the time), these earliest excavations were, of necessity, confined to a number of test trenches and test squares on the identified mound area. His excavation strategy was designed to maximally recover ceramic and faunal samples in an attempt to further elucidate the regional culture-historic sequence and obtain insights into the economic life ways of what had now come to be recognized as the earliest indigenous farming communities in the region.

Standard recovery procedures for bone and plant remains (sieving and flotation) were employed during Maggs' excavations at Ndondondwane. The finds were unique in that they yielded the first large-scale faunal (Voigt & Von den Driesch 1984) and botanical (Maggs 1984a) data for the EIA of the region. Until then, most other EIA sites excavated had been either disturbed by multiple or later occupations and extensive soil erosion, thus limiting their potential yields. The Ndondondwane data thus served to provide significant new insights into the economy and ecology of the region's EIA inhabitants, including the first positive identification of *Pennisetum typhoides* (bulrush millet) as a cereal crop (Maggs 1984a, 1984c).

Maggs recognized the intrinsic value of the site and moved to have excavations conducted over a more extensive area of the settlement. This was largely motivated by the proposed construction of a series of dams in the Lower Thukela basin which would flood the valley above the 400 m asl. level (Thorington-Smith *et al.* 1978) and consequently destroy this, and a suite of associated sites in the vicinity.

The 1982 excavations

In October 1982, J.H.N. Loubser, then a Masters graduate of the University of the Witwatersrand, was seconded by the then South African Defence Force to the KwaZulu Homeland Government to extend Maggs' original excavations. These were initiated on the mound originally investigated by Maggs and were subsequently extended by Loubser (1993). He succeeded in excavating the entire content of the mound and was able to discern, in conjunction with Maggs' original excavations, three discrete activity areas. His extended excavations corroborated Maggs' contention that one of the prime activities associated with the mound area had been the smelting of iron. He was further able to convincingly demonstrate how the mound accumulated through a series of earlier activities that included hut construction, specialist ivory-working (bangle manufacture), and ritual activities - the latter being inferred from the presence of numerous clay mask fragments (Loubser 1993:141-148).

Subsequent to excavating the mound, Loubser identified the presence of a dung deposit some 40 m to the northeast in the process of a soil coring assessment of the surrounding area (Fig. 2). This area was sampled by means of a series of test trenches and further auguring. The dung area comprised two overlapping macro-stratigraphic units: an upper loose ash/dung horizon and a lower compact dung. On the basis of his sampling, he interpreted the deposit as a cattle byre that may have shifted slightly laterally over time. He reconstructed the presence of a double-row of interconnecting palisade poles around the dung area on the basis of the presence of two postholes (1 m apart) in one of the test trenches (Loubser 1993: 122). He also recorded the presence of a possible small stock enclosure at the west edge of the area, as evidenced by a series of small postholes and an associated channel.

Loubser cored the area between the mound and dung area and concluded the area was devoid of any deposits and culturally sterile. He also investigated the larger cleared area circumscribed by the field edge. He noted the presence of a number of surface concentrations of cultural debris (ceramics, daga, slag, *etc.*) distributed linearly across the site in a N-S line up slope and to the east of the mound. The surface scatters were recorded in a non-quantitative manner, merely noting the presence or absence of various artifact classes.

Several small test squares (1x1 and 1x2 m) were placed in one of the more visible concentrations of plough-scattered daga (fired clay). The remains of a daga floor and a small ash deposit were located and sampled. One of the basis of this, and the subjective recording of the surface scatters, he surmised that a linear arrangement of domestic units was probably associated with the cattle byre and mound area, and that the site was enclosed within the modern ploughed field (Loubser 1993:112). At the south end of the field, Loubser recorded the presence of furnace fragments and smelting debris. He ascribed these to the likely presence of an EIA smelting area associated with the main site. This has subsequently been shown to be incorrect (see further discussions below).

The ceramic samples and iron smelting evidence retrieved during the 1982-83 excavations have been described in detail (*op. cit.*), while the faunal samples are in the process of analysis by Elizabeth Voigt. The botanical samples retrieved still await detailed analysis and are currently housed at the Natal Museum, Pietermaritzburg.

In May 1983, in an act of bureaucratic bungling by the army, Loubser's term as field director was terminated even though the work at the site remained unfinished. He was replaced by an archaeology undergraduate with limited analytical experience who, subsequent to the departure of Loubser from the field, chose to extend the

excavations in the dung area. He worked at the site for an indeterminate length of time (possibly 3 months, from May until August). However, no field notes are available in the archives and only photographs were submitted to the military command in place of a report. All of the retrieved artifacts (pottery and stone) were curated without any associated provenience data. These have consequently had to be discarded from the analytical process. Fortunately, the faunal remains (with provenience information) were retrieved from the field by Elizabeth Voigt and Edward Watson (then of the Transvaal Museum) during a research visit. As with Loubser's faunal samples, these are in the process of analysis and are currently housed in the McGregor Museum, Kimberley. Excavations at the site were then erroneously abandoned and excavations at another EIA site in the vicinity were initiated (Van Schalkwyk 1994a).

Post-excavation deliberations

Subsequent to the publication of Loubser's report on his excavations at Ndondondwane (1993), Iron Age archaeologists in the province realized the intrinsic value of the Ndondondwane site and its remaining potential. Its potential value is enhanced particularly in light of its association with the suite of EIA sites along this stretch of the lower Thukela basin (Fig. 1). In 1993/4, the KwaZulu Monuments Council (KMC) requested a commission to assess this and other archaeological sites in the province for declaration as heritage sites. Subsequently, Ndondondwane was listed as having Provincial Heritage Site status and will be proclaimed under pending heritage legislation in 1997. In addition, the KMC has recommended the establishment of an archaeological conservancy area in this part of the lower Thukela basin (Whitelaw 1995:5-7).

THE 1995 SEASON - SURVEY AND EXCAVATION RESULTS

In 1992, Ndondondwane was identified during a CRM assessment as a potential site to be impacted by an impoundment on the Lower Thukela River proposed as part of a larger regional water augmentation scheme of the Department of Water Affairs and Forestry (DWAF). The perceived extent of Ndondondwane fell well within the demarcated 400 000 m^2 area of proposed construction activity. A rescue-excavation contract was awarded to the KMC in mitigation for the proposed destruction of all or part of the site. The results described below soon surpassed all expectations. Once the plough zone overburden had been removed from all of these areas, and the extent of preserved deposits and features ascertained, it became apparent that the site was far more intact over a larger area than had been thought by the previous excavators.

Excavations were initiated within two of the areas previously assessed by Loubser from which there were known remaining deposits (Dung Area and Daga Area - Fig. 2). In addition, other areas indicated by Loubser as having potential deposits, or declared sterile, were also tested, with often surprising results.

Survey

Topographic Survey

Upon our arrival at the site, we discovered that Loubser's (1993) map was inadequate for our research goals. For contour purposes, it was limited largely to the 1982-3 ploughed field areas. Our research quickly revealed that the site was in fact more extensive than previously thought (to the N and E), but smaller in extent along the southern axis. As a result, we began a new topographic survey. A preliminary map showing the distribution of features (excavation areas, activity areas, scrapes, *etc.*) was prepared (Fig. 2). However, the topographic map is still incomplete because parts of the site were inaccessible during the field season.

Graded strips

A Galion Road Grader was used to expose potential midden concentrations at the outset of excavations. This machine was employed to initially remove the bush thickets on the present up slope unploughed areas of the site. These areas were last ploughed in the 1950's (C. Willmore, pers comm.) and had become encroached by *Acacia* spp. and *Dichrostachys cinerea*. Due to this thick vegetation cover and consequent impenetrability, these areas had been inadequately surveyed by both the previous excavators.

After bush-clearing, the machine's blade was lowered to scrape away the top 0,1 m of the plough horizon. This method enabled the almost immediate identification of Midden 1 (see below) but yielded very few deposits over the remaining extent of the site. Where no underlying deposits were immediately apparent, the grader's tines were then employed to rip the soil to a depth of 0,4-0,5 m. This latter method proved to be extremely destructive unless closely monitored to prevent the tines from destroying underlying in situ deposits. Scrapes 1 & 2 yielded no evidence of underlying deposits even when subsequently tested by tining, coring and trenching. This implied to us that these areas were either beyond the borders of the site or constituted open spaces (*i.e.* non-activity areas) within the bounds of the original settlement (however, see Midden Deposit 2, below). Tining was successful in three scrapes (Scrapes 3-5), clipping the tops of subterranean deposits and bringing material to the surface, thereby allowing identification of Midden Deposits 1 and 3 (Figs 3 & 4). It was these initial indications that allowed us to begin ascertaining the real extent of the settlement and where to focus our excavation activities.

Surface scatter survey

Loubser's (1993) map also did not contain sufficient quantitative surface distribution data to enable objective interpretation of his identified surface "concentrations". We thus initiated a systematic collection of surface scatter debris based upon the new grid system within the graded and tined areas of the site. The other areas were inaccessible due to dense vegetation and will be investigated in future years. Previous research on the

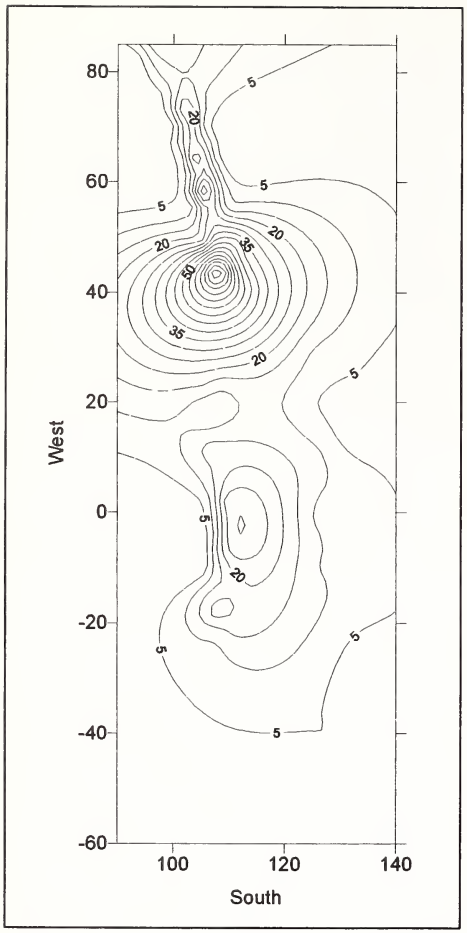

Fig. 3. Distribution of ceramic surface densities in Scrapes 2E, 3 and 5 (5 fragments per contour interval).

historical Royal Zulu sites of Ondini (Van Schalkwyk & Rawlinson, in prep.) and KwaBulawayo (Whitelaw 1994a) have shown that, even under circumstances of extensive ploughing, most cultural debris fragments are not moved more than *c.* 4-5 m from their original place of disturbance. This is a consequence of the bi-directional pulling effect of the plough successively removing and returning the material along the same plough cut. Larger artifacts, such as grinding stones and slag lumps, may however become caught up in the plough-discs and are then transported well away from their original contexts. Where these occur randomly and in isolation they need to be assessed within the possibilities of the above.

By quantitatively assessing the differential surface distributions of cultural debris over a site, a more

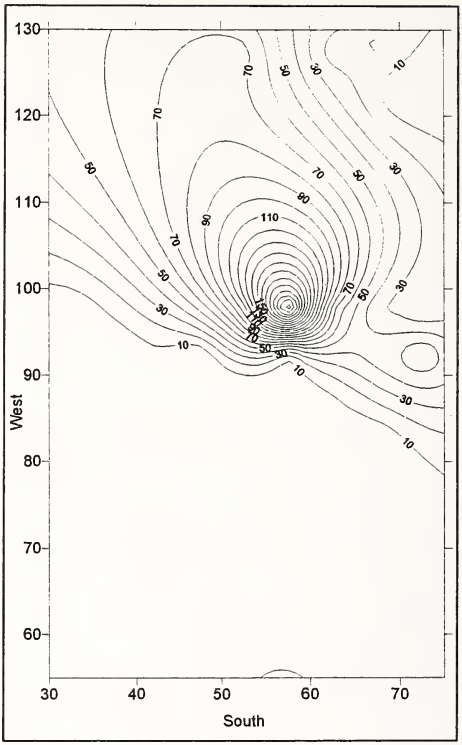

Fig. 4. Distribution of ceramic surface densities in Scrape 4 (10 fragments per contour interval).

objective indication of surface concentrations can be obtained. High density distributions are indices of possible subterranean concentrations (middens) and potentially features associated with the occupation of the site. Alternatively, low density distributions quantify the extent of plough disturbance and are potential indices of non-activity areas. In order to quantitatively test our visual assessments of the respective scrapes, and those surface "concentrations" subjectively recorded by Loubser (1993), we initiated our survey by laying out transect lines along the winrows thrown up by the grader blade within the graded strips (Scrape 1-5). We subsequently extended this to an area that we had ploughed in the southern sectors of the site (Scrape 6).

The quantities of ceramics, bone and culturally modified stone were determined for each 5 m interval. The isopleths subsequently generated illustrate the location and extent of activity and non-activity areas within the site. Three previously undetected activity areas (Furnace 1, Midden Deposits 2 and 3; Figs 3-5) were located by mere coarse analysis of the survey data *in loco*. Each of the scrapes will be discussed further in relation to the excavations conducted in these respective areas.

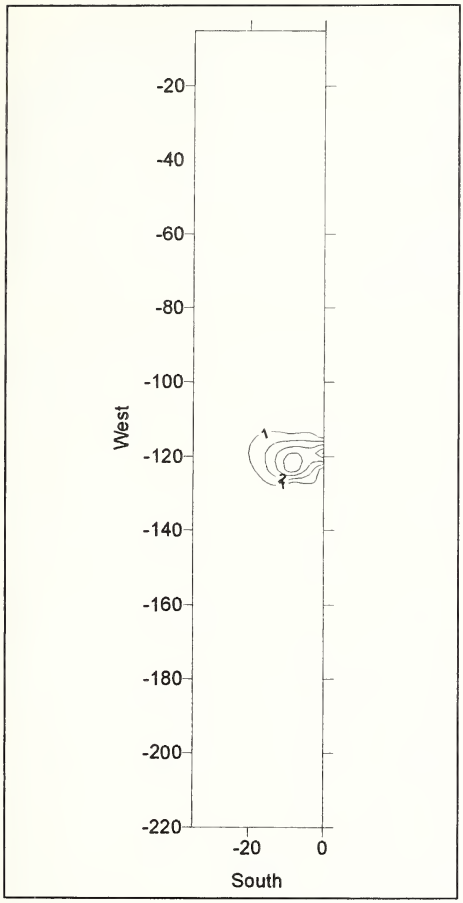

Fig. 5. Distribution of daga surface densities in Scrape 6 (1 fragment per contour interval).

Excavated Areas

Several areas of the site were excavated. Each provided an important insight into the spatial organization of the settlement, and will be discussed in turn:

Dung Area

This area was identified during the 1982-3 excavations and sampled by a number of test trenches. The original excavators exposed *c.* 112 m^2 of the deposit in an attempt to determine its extent, and the possible presence of any associated activity areas within or around what was then identified as being a cattle byre (Loubser 1993:121-123). It was characterised by thick and extensive deposits of ash and dung, and the occasional presence of surrounding postholes. Unfortunately, only part of the area had been previously tested by Loubser, and all of the subsequent

Fig. 6. Photograph (95-20-16) of excavations in Dung area (facing magnetic north). Note the unexcavated white ash concentration in the centre. This was the level at which the white ash appeared immediately beneath the plough zone.

excavator's data were lost. As a result, new excavations were extended in this area.

Our excavations on the site were initiated in the Dung Area (Fig. 6) primarily to obtain supplementary and accurately provenienced faunal and ceramic samples to replace those that were caused to be discarded by the actions of the last excavator. Further, in the light of certain current theoretical positions, the cattle byre in Iron Age society is where high status individuals should be buried, and where the community's grain should be stored. We wished to test for this assertion.

We exposed a further *c.* 140 m^2 of deposit to an average depth of 0,65 m (91 m^3). Almost the entire extent of the dung and ash deposits were mapped. The deposit was excavated in its entirety to the N, W, and S. Only some areas to the east remain unexcavated. Although the maximal extent of the Dung Area was ascertained by coring and test trenching, it was not possible to excavate the entire deposit during this field season.

Beneath the plow zone, three horizons, with small localized deposits, were uncovered. The upper horizon was a thin deposit of almost pure ash (with a very low dung content), with few artefactual or bone remains. The middle horizon was a thick deposit, intermediate in colour between upper and lower, composed of ash mixed with dung, and with higher frequencies of animal bones and ceramics. The lower horizon was darker. It was composed of very thick dung in the NE quarter of the excavation area (Loubser's excavation area). In the rest of the excavation area, it was composed of dung mixed with charcoal and ash. Fewer ceramics and bones were found in this horizon. Beneath this lay a hard basal surface leading to the sterile substrate. The stratigraphy would appear to indicate at least three sequential phases of use of this area - the first as a livestock byre, with the livestock preferentially congregating downslope in the NE corner, where the dung was thickest. The second phase of use appears to indicate intensive dumping of ash, ceramics, and food remains into the western and southern parts of the byre.

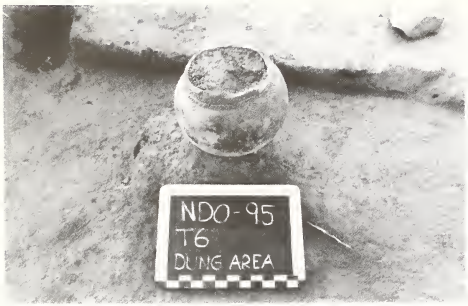

Fig. 7. Photograph (95-22-12) of whole ceramic pot in quad T6, in centre of Dung area (facing magnetic SSW).

Fig. 8. Photograph (95-23-30) of burnt daga hut-floor in Transect 1. Note differential firing in the centre and around the edges. The pestles were not found on the *in situ* grinding stones, but were found in the 1x2 m square in which the grinding stone is found. Also note the thick white ash layer extending from the burnt floor into the NW and W profiles.

Livestock movements probably circulated and mixed the ash with dung over a larger area. In villages in the region today, the byre is where sizeable quantities of ash and other refuse are dumped. It is a ritually safe area to dispose of ash and the remains of other activities that could otherwise be used by others to harm its original makers and users. The third use was for dumping of ash, possible in anticipation of abandonment of the site.

Whilst we were able to confirm Loubser's observation of both a basal hard dung horizon and an overlying softer dung layer (our Lower horizon) throughout most of the area, the latter was replaced by a concentrated ash horizon in the centre of the deposit (Squares S, T, U, V:1-5). Excavation revealed that this layer filled a shallow basin, *c.* 2 m in diameter, that was apparently purposefully prepared. Substantial ceramic and faunal samples were retrieved and a number of discrete activity areas were discerned both within, and immediately adjacent to, the cattle byre. These included iron-smithing locales, hearth-fires associated with the cooking of meat, and the ritual burial of a whole pot at the supposed top entrance to the enclosure (Fig. 7). Tentatively, none of the ceramics from this area appear to have been used for cooking. Most appear to have been eating or drinking vessels. The S and SW perimeter of the basin yielded a rich concentration of faunal remains and ceramic vessels. In relation to most other excavated areas in the byre, the bones and ceramics associated with the basin exhibited a minimal degree of fracture, indicating limited post-discard trampling.

Transect 1

In light of recent interpretations of EIA settlement layout from sites excavated at Inanda in the Umgeni valley (Whitelaw 1993, 1994b), it was deemed expedient to test Loubser's (1993) vacant zone between the Dung and Mound Areas. Whitelaw (*op. cit.*) found remnants of floor areas in the centre of his sites, between the cattle byres and other associated specialist activity areas. To test the possibility that such a situation may exist at Ndondondwane as well, a linear series of test squares (collectively known as Transect 1) were opened in the intervening space. There was no indication, from a subjective evaluation of the surface topography and cultural remains prior to excavation, that any architectural features or artefact concentrations may have occurred in this area.

Although the plough horizon yielded randomly scattered and fragmentary pieces of cultural debris, these are interpreted as being plough-drag from the adjacent Mound and Dung areas. Excavation was started in square 1S/1W and excavated to sterile base. Alternate 1x2 m squares were excavated in two rows (A & B). Where no features or culturally intact deposits were discernible the next square was then opened. This continued for the first 10 meters. At 10S/1W a thick ash deposit, associated with substantial quantities of ceramics, bone, and *in situ* burnt daga was located at about the 0,8-0,9 m depth level. This area was consequently widened to expose an entire burnt daga circular floor located at *c.* 1,15-1,20 m below the current land surface (Fig. 8 & 9).

The superstructure was probably beehived-shaped based upon the dearth of peripheral posthole remains, the presence of a single large posthole in the centre and reed impressions in the burnt daga, and the nature of and the distribution of intensely burnt floor daga. It was most intensely burnt in the centre of the floor, indicating the collapse of a beehive structure. The floor was baked when the house burnt down. The season of its burning could be determined by the unidirectional nature of the ash deposit, which extended to the north and northwest of the hut floor. It is thickest in the northwest profiles of the area. The prevailing winds in the Thukela are from the southeast, only, in the winter.

Associated with the floor were a number of flat grinding stones and typical EIA upper grinders. The remains of at least six whole ceramic vessels were clustered along the N and NE extremity of the floor and a large flat stone (suitable for sharpening iron tools) was found toward the centre of the floor. Few artifacts were recovered from the surrounding area. It would seem that

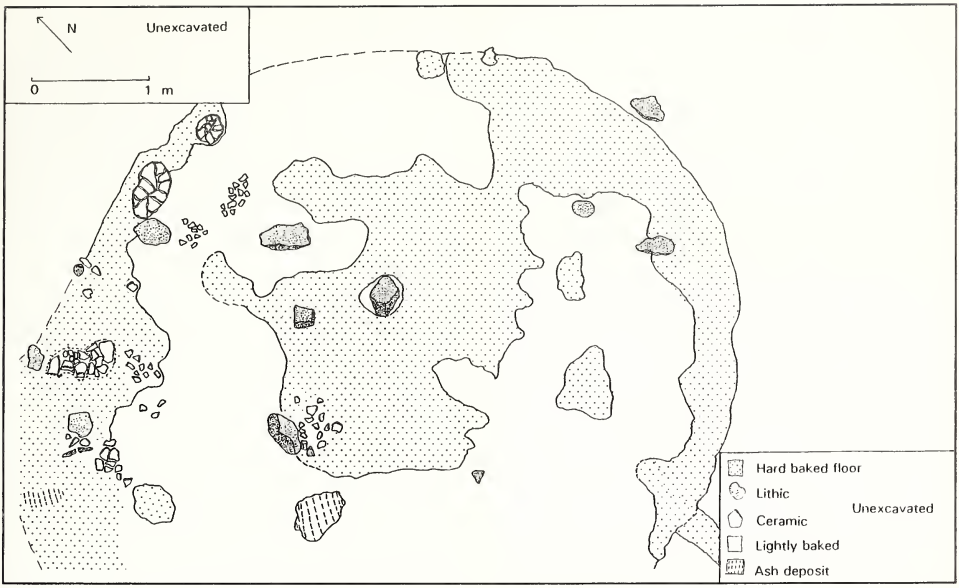

Fig. 9. Drawing of burnt daga hut-floor in Transect 1.

the house and its contents were entirely abandoned as it caught fire. It is hypothesized that this is the remains of a men's hut based upon its proximity to the iron working areas and the byre, the presence of iron tool sharpening stones, ceramic used mostly for vessels for eating and drinking, and its restricted location with respect to other identified domestic complexes.

Except for the *in situ* ceramics visible in the photographs, all artefact classes associated with the floor feature were retrieved and bagged for curation and further analysis. The *in situ* remains were left in place to allow for the possible future development of an interpretive centre over the structure. At the conclusion of the contract the feature was overlain with a geotextile blanket and backfilled. Due to their depth below the current surface, future agricultural activity (specifically ploughing) is unlikely to disturb the underlying deposits.

Once the extent of the burnt floor feature had been determined, Transect 1 was extended for a further 15 m to intersect the remaining peripheral deposits of the Mound Area. The objective here was to investigate the stratigraphic relationship between the floor feature and the Mound area, and to discern the distribution of features and artifacts in the intervening space. No architectural features were encountered north or south of the floor feature. All of the *in situ* artifacts were found associated with a single thin cultural horizon in this area. The preserved deposits over the entire length of Transect 1 were deeply buried by colluvial deposits beneath the modern surface. In total, some 48 m^3 of overburden were manually removed to expose the underlying cultural horizon. The preserved cultural horizon began 0,6 m beneath the modern surface and extended to a maximum depth of 1,2 m. It appeared to gradually rise from the north (*c.* 1,0 m) to the south (*c.* 0,6 m) as the Mound area was approached. This reflects the original EIA topography. Subsequent topographic analyses indicate that the base of the Mound area was the highest feature on the EIA landscape. Due to their depth below the modern surface none of these basal deposits had been disturbed by latter day mechanical ploughing activities.

A relatively uniform low density of artifacts were noted in the open excavated spaces immediately to the north and south of the floor feature. The only visible concentrations were noted as the trench connected to the peripheral deposits of the Mound area. The squares were excavated in 1x2 m collection units because of their exploratory nature and the material was bagged by stratigraphic horizon. Detailed discussion of these finds awaits laboratory analysis.

Based upon the limited area of excavation in Transect 1 and subsequent coring, it would appear that the burnt floor feature is the only large architectural feature in the intervening space. Most of this space appears to be represent a large open-area within the settlement.

Furnace 1

During the preliminary surface scatter assessment within the confines of the present-day field, a concentration of burnt daga fragments, raw ore, and culturally modified stone cobbles were observed on a slight topographic rise towards the south end of the site

(*c.* 110-130 S) on the N-S axis (Fig. 2). The area was initially investigated by three widely-spaced 1x1 m test squares. Excavations at 124S/1E (expanded to 2x2) encountered evidence of high temperature burning of the horizon immediately beneath the plough zone and overlying a bowl-like depression (1.5 m diameter) filled with carbonized material (Fig. 10). The stratigraphy in this area comprised a very thin plough zone horizon (*c.* 5-10 cm), and a thicker underlying cultural horizon which terminated on a hard reddish-brown pre-EIA substrate.

Fig. 10. Photograph (95-20-1) of burnt earth horizon and bowl-like feature in Furnace 1 area.

Subsequent coring in all directions from this trench indicated that the underlying hard sterile substrate formed a natural slight topographic rise in the EIA landscape. This rise is between two modern adjacent winrows and was exposed by erosion and ploughing. Two further test squares (112S/1E; 118S/1W) confirmed the extent of the topographical feature and the nature of the activities conducted here. There was only a thin preserved cultural horizon between the plough horizon and the sterile substrate. Most of the cultural horizon in these squares had been incorporated into the plough zone, consequently decontextualizing the cultural residues, and leaving only a basal remnant. This was indicated by the contiguous distribution of large charcoal fragments (>5 mm) and burnt daga flecks (*c.* 5-15 mm) through the plough zone and into the cultural horizon.

The rise had been appropriated as a specialised activity area of the EIA settlement. The nature of the cultural horizon suggested a number of pre-iron smelting activities. First is the crushing and preparation of raw ore as evidenced by the large hammerstone cobbles and small residual raw iron ore fragments. The latter were distiguished from iron ore fragments in the Mound and other areas by the substantial inclusions of nonferrous impurities (*eg.* quartz and gneiss). The other areas of the site where iron working activities were encountered characteristically contained relatively purer iron ore residues.

The presence of hammer and anvil stone-cobbles provided further evidence in support of this inference. These artifact types are also not found in such quantities associated with other iron-working areas of the site. Secondly, the small bowl-shaped depression was found almost in the centre of the baked earth horizon's spatial distribution. The sediments in the depression appear to have been baked at higher temperatures than normal domestic fires. Given the size of the baked soil distribution around the depression (*c.* 10 m diameter) and the presence of charcoal fleck concentrations together with small fragments of burnt daga in the depression, these suggested that the basin area may have been associated with the base of a charcoal preparation area. Iron production in the Iron Age is known to have required large quantities of charcoal (*cf.* Killick & Van der Merwe 1977).

Finally, ceramic remains are characteristically sparse in this area and comprised largely of EIA undecorated bowl fragments. Only a single herring-bone pattern neck shard was recovered during surface collection of the area. The total absence of bone residues and other ceramic vessel classes suggests that minimal or no food preparation and consumption was conducted at this locale. The bowl fragments appear to be of small vessel size, suggesting that they were probably drinking vessels. This makes sense considering the heat generating nature of the activities postulated for this area. In sum, we postulate that this specialised activity area was at the south edge of the settlement. This is tentatively further corroborated by the provisional results of the surface scatter analyses undertaken.

Pump House

Loubser (1993:fig. 1) indicates a surface scatter of burnt daga furnace fragments at the southern edge of the ploughed field. These surface fragments were relocated in 1995 using his location criteria and two noncontiguous test trenches were excavated in the area (test trench 1 and pump house; see our Fig. 2) where the concentrations appeared most dense. The trenches were excavated to a maximal depth of 30 cm beneath the surface. In Test Trench 1, two major stratigraphic horizons were noted, the modern plough zone (*c.* 0,2 m) and the hard reddish brown sterile (pre-EIA) basal horizon. Excavation was then moved to a second test trench (Pump house) where the same two horizons were again observed. However, in this test trench, concentrations of baked daga fragments were found in the plough horizon. Consequently, the excavations were laterally expanded to ascertain their nature and extent. Upon a closer examination of the burnt daga fragments it was realised that these were in fact baked red brick fragments, cemented together with a lime mortar. Subsequent enquiries with the previous landowner revealed that the feature identified by Loubser was in fact the remains of a modern water pump house platform. It was gutted by fire in the late 1960's and subsequently abandoned. As a result of our investigations in this sector of the site, we concluded that there are probably no in situ EIA cultural remains in this area. The surface scatter analysis data indicate that the area appears to lie beyond the south edge of the EIA settlement.

Daga Area

This was another of the areas of the site tested by Loubser (1993) on the basis of a relatively high density of surface scattered fragments of fired daga in this area. He suggested that these might be the remnants of plough-damaged EIA hut floors and concluded that they occurred in a probable area of domestic residence. We excavated a series of exploratory trenches (175 m^2), to a maximum depth of 0,60 m (*c.* 70 m^3), over an area of some 500 m^2 within which the greatest surface density of daga fragments were present. As over the rest of the site, the plough zone was observed to a depth of *c.* 0,2-0,25 m. Both this, and the underlying horizon, proved to be culturally sterile. By extending our excavations to the vicinity of Loubser's (1993:123) test trenches we exposed a small intact ashy midden containing cultural debris (ceramic, bone and *Acatina* sp. disc-beads). This feature, centred on 50S/60E, was *c.* 2.5 m^2 in extent and located 0,3-0,4 m below the present day surface. Although the depth of colluvial overburden is markedly shallower on this up slope part of the site, the feature was sufficiently deeply buried to not have been affected by ploughing. The midden was excavated in its entirety and all the artefacts were retrieved.

Further lateral excavations and subsequent coring failed to locate any further features or artifact clusters associated with either the midden or the surface scattered daga fragments. Mechanical scraping to the NE of these excavations also failed to reveal any further evidence of EIA activity. A surface concentration of EIA cultural debris was exposed at the southern extremity of Scrape 2. We postulate that the excavated ash feature and the surface scatters of baked daga immediately downslope in the Daga midden are all probably associated with the up slope Midden Deposit 2, and probably represent a discrete household cluster of the original EIA settlement similar to that in Midden 1(see below).

Midden 1

This area was first located on a foot survey of the site when a low density of scattered cultural debris was observed on the surface. Subsequent mechanical scraping and surface collection (Fig. 3) exposed further debris concentrations. A 2x2 m test trench, centred on 35N/ 110E, was excavated to sound the potential deposit (Fig. 11). An ashy midden (Ash 1) was located at *c.* 0,25-0,3 m below the surface and it was identified as the source of the plough dragged surface material. Subsequent excavation of the ash deposit indicated that it was a stratigraphically complex deposit, with at least three superimposed ash deposits, and at least two spatially separated lateral deposits (north and south of the intersection of squares). The ash deposits were probably sweepings from domestic hearths. Each was separately excavated. The ash was deposited into a artificially-made slight depression that was dug down to the rock substrate.

The area surrounding the midden deposit was then excavated (over *c.* 140 ^{3}m) exposing the presence of three grain-storage pits (Fig. 11). Each of the pits was re-used at the end of its storage pit life phase as a refuse pit, and filled with a variety of debris. The two deepest pits were found close together in the southern end of the area (pits 1 & 2). Pit 1 was the deepest (*c.* 1.4 m), and extended straight down through the rock substrate for most of its length. It seems to have slowly filled up over time. Pit 2 was much shallower (*c.* 0,90 m), but filled more rapidly as evident by the differing nature of the deposits and their content. Both pits were filled with domestic debris including both broken upper and lower grindstones, ceramics, ash and bone. They were both dung lined which indicated their prior function as grain storage pits. The fill of pit 2 reflected its final special history of use. The fill was a stratigraphically complex series of superimposed deposits (Fig. 12). At the bottom of the pit, four large cow bones were found. These appear to represent some kind of ritual activity signalling the advent of a new phase of use for the pit as suggested by the disposal of essentially unbroken and still useful mortars and pestles. The middle and upper horizons were rapidly deposited. They contained an unusually large number of large and unbroken upper and lower grinding stones, ceramics, animal bones, mixed with ash. Pit 1, by contrast, contained broken grinding stones but no large pieces of ceramics or bones. These deposits beg further interpretation.

Pit 3 was in the northern end of Midden Deposit 1 (Fig. 13). It was much shallower (*c.* 0,4 m) and contained two major horizons. The lower horizon contained large fragments of broken pots mixed with ash and animal bone fragments. The upper horizon contained a large inverted globular ceramic pot. Subsequent excavation revealed that the pot contained the burial of an infant. The infant was face-down in the deposit, implying that it was lying on its back in the pot with its face up toward the mouth of the pot, as the pot was being carried to the pit. The pot was inverted into pit and the infant fell forward (Fig. 14).

The cultural contents of the deposits in this area strongly suggest a domestic-type space. This was the first time that such an activity area has been identified and extensively excavated on the site. Further, Midden 1 yielded a large ceramic and faunal sample which will be of interest during later analysis for comparison between those occurring in the Dung and Mound Areas. Based on ethnographic models, the latter could be presumed to be essentially a male activity areas whilst Midden 1, representing domestic space, can be presumed to be a predominantly female locale. The presence or absence of specific vessel classes and faunal body parts within the respective locales can potentially provide valuable insights into gender and other social relations in EIA society.

The large ash deposit was probably the repeated deposition from a single kitchen area, that was probably located in the unexcavated areas to the south or west of the excavated area. It is likely that the structures associated with Midden 1 are located to the south or west of the excavated area. This conclusion is based upon the relative distribution of storage, refuse and living areas in ethnographically documented household compounds from

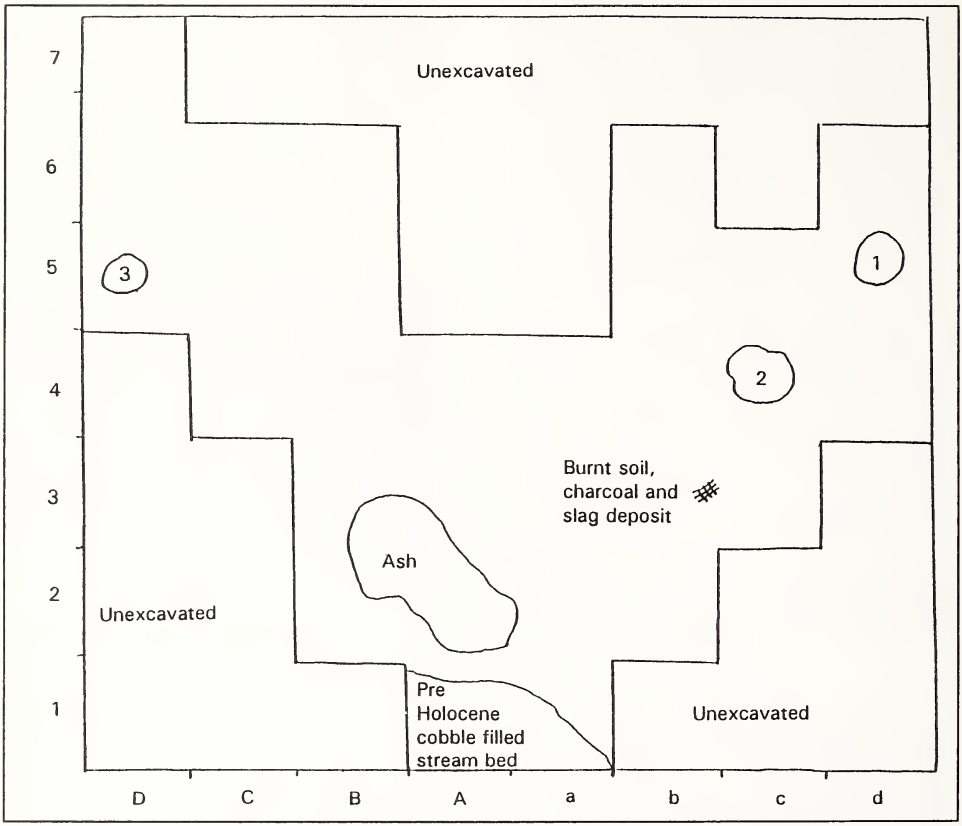

Fig. 11. Plan of Midden 1.

this region, given the nature of the slope (sloping from west to east) and the semicircular distribution of pits and ash deposit. This possibility will be investigated in future seasons. There is little likelihood that the this domestic area extended to the north or east based upon the surface collections since scrapes 3 and 5 yielded little cultural debris to the north and east of Midden 1.

Midden Deposit 3 (Ivory Midden)

A third potential domestic activity area was identified during the course of the systematic surface collection of scrape and ploughed area 4 (Fig. 4). This surface hot-spot is located in the NE sector of the site (*c.* 100N/60E) and was identified as a domestic area on the basis of the surface artefact classes - typical EIA grinding stones, and a range of ceramic vessel types used for food preparation and storage. This area is an equivalent distance from the Dung and Mound Area as the other already identified domestic activity areas (Daga Area/ Midden Deposit 2 and Midden 1). The former, we now believe, are centrally located in the layout of the site.

An enigmatic find in this area was a split hippopotamus canine tooth. Maggs (1984a) and Loubser (1993) have recorded hippo remains at the site and, given its riverine locality, exploitation of hippopotami for meat and ivory by the inhabitants of Ndondondwane can be expected.

Coring has indicated that *in situ* deposits are present below the plough zone (± 0,3 m) and are thus spared from potential damage by ongoing ploughing activities. The Ivory midden (Midden 3) is located close to the northern boundary of the field and we suspect may extend partially beyond the existing collapsed fence-line. It will be the focus of excavation in proceeding field seasons.

Site Taphonomy

Pre-excavation attritional processes

During the foregoing survey and subsequent excavations, a number of processes were identified as affecting the stratigraphic integrity of deposition, and assemblage

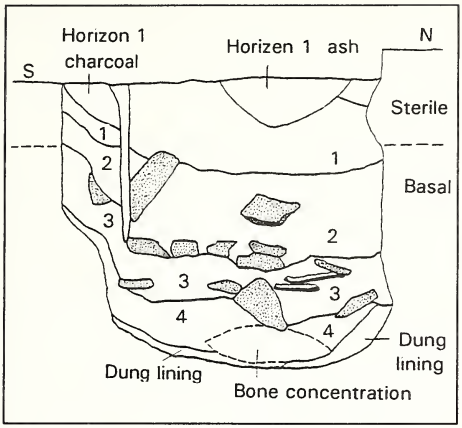

Fig. 12. Profile of pit 2 in Midden 1.

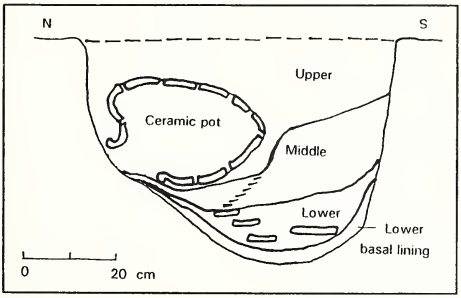

Fig. 13. Profile of pit 3 in Midden 1.

attrition. These are important to identify in order to understand the ways in which deposits and assemblages have been modified since they were original formed.

The local soils are intrinsically acidic and consequently organic remains tend to be poorly preserved, except in midden and/or ash deposits where an alkaline micro-environment is created. Thus, organic remains that have been disturbed by plough actions and have subsequently become incorporated in the plough zone suffer relatively rapid deterioration. There is also little evidence of organic remains in the cultural horizon beyond the midden/ash deposits. This is not a reflection of depositional behaviour, but reflects local soil pH. Pits, because of their use as domestic debris dumps, including hearth-ash, tend to have relatively alkaline deposits and consequently good organic preservation. However, even those bones that were recovered in the ashy deposits were extensively leached and were, as a result, very fragile. If handled roughly they simply begin to fragment and disintegrate.

Fig. 14. Photograph (95-22-32) of burial pot and infant skeleton in the upper horizon of Pit 3. The lower horizon is fully visible since the overlying upper deposit was mostly removed. Facing magnetic NE.

Downslope erosion and the formation of colluvial deposits have, contrary to the situation in most other EIA research areas in the province (Maggs 1984b, Maggs and Ward 1984), had a positive effect upon preservation of the site. A substantial deposit has accumulated in the lower NW sector of the site above the cultural horizon, sealing and preserving the cultural horizon (Transect 1). In the SW sector of the site (Furnace 1), erosion has brought the base of the cultural deposits almost to the modern surface. In the eastern half of the site, with its more substantial slope, downslope erosion does not appear to have damaged the cultural horizon as there has been a continual replacement of the A-horizon from deposits further up slope.

The major taphonomic agent across the site has been, and remains, modern mechanical ploughing. The entire site-area within the modern fence was first ploughed in the 1950's (C. Wilmore, pers. comm.) and subsequently only the lower half of the site was ploughed with any regularity. These activities have created a plough zone of variable thickness, its maximum depth being 0,30-0,40 m over the burnt floor feature, and it is at its thinnest over Furnace 1 (50 mm). The thinness of the plough zone here is due to the proximity to the surface of a hard baked cultural horizon in this area that sits atop a natural hardpan rise in the local topography.

On the upper slopes or east half of the site, the thickness of the plough zone is also affected by site topography. This area has a substantial slope and consequently colluvial deposition has been limited. This in contrast to the situation on the lower or west half, where the terrain is more level, and the colluvial overburden was observed to exceed 0,80 m in places. Ploughing has thus caused greater destruction of the upper part of the cultural horizon in the up slope areas, decontextualizing embedded artifacts and effecting substantial assemblage attrition. Relatively fewer bones were recovered in the plough horizon here, and ceramics were more fragmentary than in the corresponding plough zone/cultural horizon interface further down-slope.

All of the excavated deposits experienced a varying degree of bioturbation, the principle agents being tree roots and burrowing rodents. These were mapped whenever identified. For example, a number of charcoal concentrations within the cultural horizons may well be derived from the root stock of post EIA occupation clearing and burning of the succeeding woodland cover. These charcoal concentrations were occasionally sampled for later species identification.

The use of unskilled labourers and the hard nature of the sedimentary matrix in the cultural horizons resulted in unavoidable damage to much of the retrieved bone samples. This was exacerbated by the need to use picks, geological hammers, and other coarse tools in order to separate bones from their hard matrix. During formal faunal analysis the extent of this damage will be have to be monitored.

Post-Excavation Taphonomic Strategies

All sediments from the cultural horizons, pits, and associated deposits were sieved daily immediately after retrieval through 3-5 mm meshes ensuring the systematic recovery of remains. Only the plough zone sediments were not sieved. This ensured that differential collection by artifact class or size would not be a factor in the eventual analysis.

In the ceramic class, all diagnostic shards were measured by volume and retained. At the beginning of the field season (April-June), the miscellaneous and nondiagnostic shards were measured by volume per excavation unit and discarded. Culturally-modified stone was recorded, significant type-pieces selected for curation, and the rest discarded after being measured by volume. This practice was undertaken in order not to burden limited curation space in the housing institution of the collections.However, this practice was abandoned and all nondiagnostic ceramic shards were retained during the second half of the field season (July-August) after agreement with the Ondini Cultural Museum to curate all the materials.

Maggs' and Loubser's collections are currently housed in the Natal Museum, Pietermaritzburg and all the retained excavated remains from the 1995 project have been transferred to the Ondini Cultural Museum for curation and analysis. It is planned that their ultimate storage destination be in Pietermaritzburg in order that all the collections from the site be housed together.

DISCUSSION AND CONCLUSION

A rapidly expanding local population's increased needs for subsistence agricultural land and the increasing tempo of sorely needed infrastructure development have begun to place growing demands on the integrity of a number of major archaeological sites in the Thukela Basin in the last decade. The lower basin in particular contains some of the best preserved EIA village settlements in South Africa and these consequently constitute a major cultural resource of national significance. These, however, are now under ever escalating threat of destruction[1].

The 1995 excavations clearly indicated that the site still has a vast and yet untapped potential for enhancing our understanding of EIA life ways. However, in order to achieve this, more extensive investigation of the site was deemed necessary in order to properly excavate the identified deposits, adequately recover the material, and analyse the results. This was not possible to fully accomplish within the 1995 season. By the end of the field season, our excavations had confirmed the uniqueness of Ndondondwane. It was clearly a single occupation site spanning possibly only a few decades and only a single ceramic-phase (Fig. 15); a rare occurrence on sites of this nature in the region.

As such, it forms an important test case for eventually discerning which of the proposed modes of social and economic organization is representative of the EIA of southern Africa. Most other comparable large and intact EIA settlements in the region exhibit multiple occupations, often spanning more than one ceramic phase and several hundreds of years. This invariably results in a juxtaposition of cultural evidence, which often confounds interpretation of the relationships between various phenomenon on the site. The situation is obviously compounded when dealing with more complex issues, such as intrasite social and economic organization.

The preliminary results of the excavation indicate the existence of a well-ordered community. At the centre of the community lay structures and activity areas associated with a variety of what are considered to be male-associated activities in traditional eastern Bantu culture (a large men's hut, a live-stock byre, iron furnaces, and iron and ivory working areas). Around this core area, moving up-slope from the river, was a large open area, with very little debris and no evident features. It is feasible that this may have been the location of kitchen gardens and fields, the extent of the settlement providing a barrier, and hence protection for crops, from wild ungulates and graminivorous birds. It was probably an area where the community as a whole could gather.

At the north end of the site, still relatively isolated from the domestic complexes, lay a charcoal preparation (pre-smelting) area. It was also probably associated with male activities, given its isolation and the ethnographic association of males with iron production. At least three domestic household complexes were found in a large semi-circle (NW, W, and SW) around the central open area. They are equidistant from the activity areas at the centre of the site. The three domestic midden deposits are areas where household activities took place (*viz.* food processing and storage, sleeping, tool repair, ceramic production, *etc.*). Such domestic complexes are the traditional domain of women in eastern Bantu ethnographic contexts. This spatial distribution of activity areas appears to tentatively support Huffman's Central Cattle Pattern model (1993) for the Early Iron Age in its broad outlines - with a central area dominated by male activities (cattle keeping, iron production), surrounded by a plethora of domestic (female focused) compounds. The domestic compounds are distributed in an arc from the central area of the site and are almost equidistant from

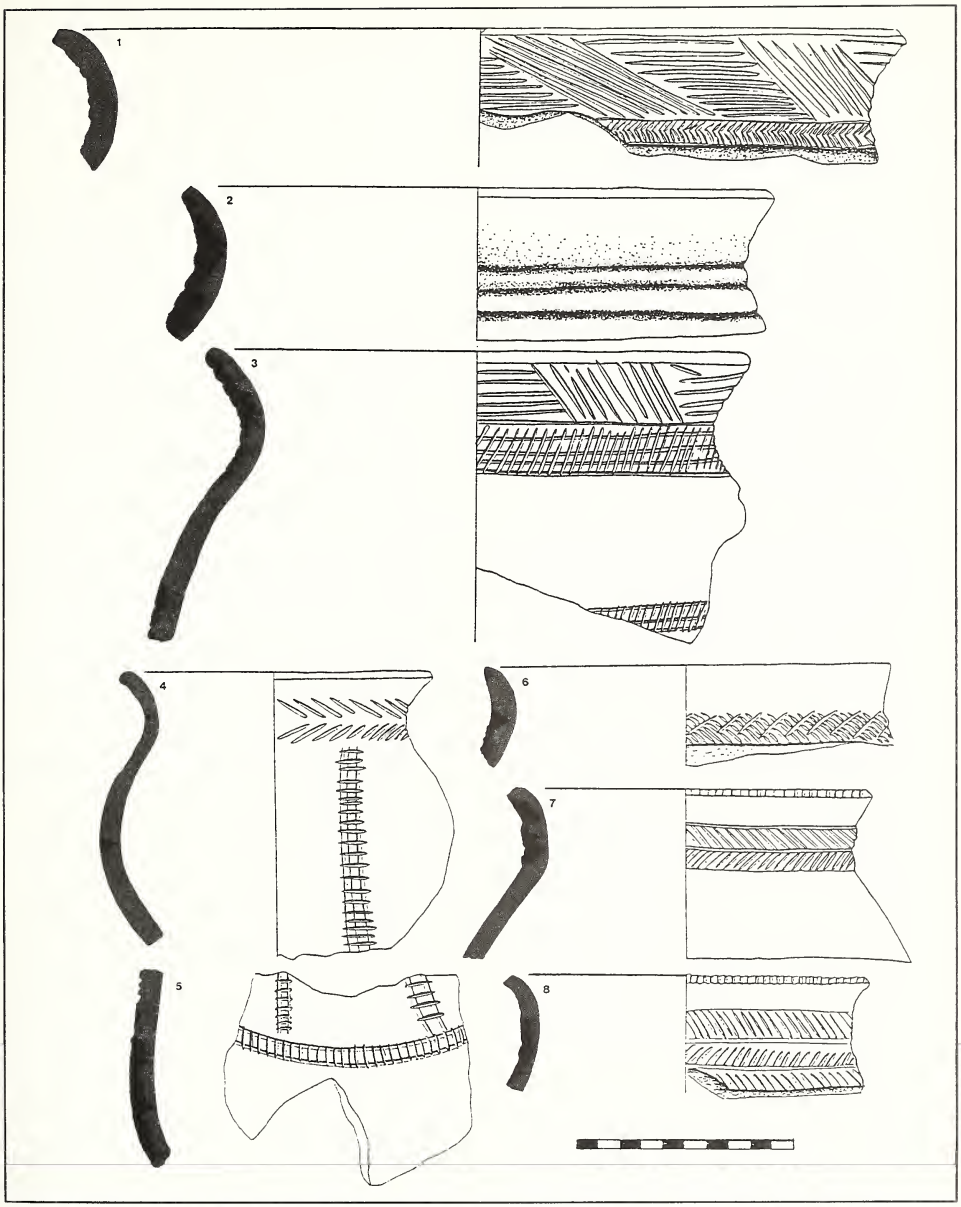

Fig. 15. Drawing of some of the EIA ceramic diagnostic types characteristic of Ndondondwane found during the excavations.

the central hut. Further research at the site should provide a more comprehensive test of the model.

Ndondondwane's uniqueness lies in its relatively undisturbed state of preservation and its apparent short term occupation[2], thus providing an opportunity to elucidate the spatial organization of a single community during the Early Iron Age of the region. This uniqueness is further illustrated by the number of separate teams that

have attempted to explore it (five different teams over 17 years)[3].

ENDNOTES

1. Informed by this, and the previous archaeological research in the lower Thukela region (Maggs 1984; Loubser 1993; Van Schalkwyk 1994a, 1994b, 1995), the KwaZulu Monuments Council saw fit to provide seed finance for an extended multi-year research programme to ascertain the extent of these cultural resources and what conservation strategies should be put in place. This drew the attention of international research workers and in June 1994 the KMC approved a collaborative research project with the Department of Anthropology, University of Manitoba, Canada, in which it was hoped that international funding could be secured to finance the project for the long-term. The inception of the international project began in July 1995, just as the CRM contract was winding down. At that point, the Canadian team arrived in the Thukela basin and participated in the Ndondondwane research project from July 15 until August 30, 1995.

2. Whitelaw's (1995) report to KMC on the statutory recognition of archaeological sites recommended that the three major EIA sites of the Lower Thukela River basin (Mamba, Wosi and **Ndondondwane**) be declared as provincial monuments (Provincial heritage sites) and to be jointly conserved within an historical preservation area or cultural conservancy. He further proposed that an EIA site museum/interpretive centre be located at Ndondondwane in the light of the proposed new Maphamulo-Eshowe transport axis. These sites, located at accessible distances downstream of the presently rustic tourist resort of Shu Shu Hot Springs would further, attract even greater public focus; particularly if the latter's development potential were soon realised, and they accepted by the KMC which is proceeding with the envisaged proclamations. It is clear that Ndondondwane still retains enormous potential. It would then be an undeniable shame if this scientific and community resource were to be destroyed under the guise of "development". The site's merit do not however merely lie in its value as a research resource, but also as a marketable tourist asset in a local development *scenario*. It has a very real potential as a resource of both seasonal and permanent employment in a presently impoverished local community.

3. Investigation of the site has never been able to be brought to a successful conclusion for a number of logistical reasons, such as size and the lack of sufficient long-term support funding, which may finally be assured through the international collaboration of the present research team.

ACKNOWLEDGEMENTS

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RIET RIVER REVISITED: COMMENTS ON RECENT FINDINGS AT PRAMBERG*

A.J.B. HUMPHREYS

Department of Anthropology and Sociology,
University of the Western Cape,
Private Bag X17, Bellville, 7535

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ABSTRACT

Recently published archaeological research along the Riet River is discussed and alternative interpretations offered which hint at the possibility of providing a more accurate or realistic reflection of events along the Riet during the early historical period. These, in turn, have implications for the earlier Type R settlement period.

INTRODUCTION

The stone walled settlements located along the Riet River roughly between its confluence with the Vaal in the west and the Kalkfontein Dam in the east (Fig 1.) were first dubbed "Type R settlements" by Maggs (1967) during his seminal study of the distribution of Iron Age sites in the Orange Free State using aerial photographs. Maggs's (1971) work and subsequent research by myself (Humphreys 1972) led to the general interpretation of the settlements as having been occupied by former hunter-gatherers who, through contact with mixed farming communities to the north, had developed their own form of pastoralist existence. A suite of dates from various sources (burials and settlements) suggests that the 'flowering' of the lifestyle represented by the Type R settlements ranged from about AD 1380 to 1780. This interpretation has been perpetuated in all later research and references to the Riet River settlements (*e.g.* Humphreys 1988; Morris 1992; and others referred to below).

Recent observations reported in this journal, most notably in the Pramberg area (Brink *et al.* 1992; Dreyer 1996), have, it may be suggested, opened the door to a more detailed understanding of the social dynamics that were in place during the early historical period - a period during which the Type R settlements appear to have been abandoned. These recent observations at Pramberg, moreover, caution that the 'local hunter-gatherer turned pastoralist' model developed to explain the Type R settlements might be an oversimplification of the position along the Riet River even at that time. The historical picture is far more complex and it can consequently be expected that the archaeology - and its interpretation - should reflect this complexity. The purpose of this contribution is to revisit the Riet River, more specifically the Pramberg area, 25 years after my own research and point out some possibilities for more sophisticated insights in our reconstruction of early activity along the river - both before and after the Difaqane - by offering alternative interpretations of the evidence presented by Brink *et al.* (1992) and Dreyer (1996). First, however, it is necessary to examine the historical context along the Riet River.

HISTORICAL BACKGROUND

There is a set of historical observations that relates directly to the Pramberg area and these can be used to gain some idea of the range of remains - for that slice of time, at least - that can be expected potentially to be preserved in the archaeological record.

Andrew Smith (1939) travelled along the Riet River through the entire area in which Type R settlements occur during the period 30 December 1834 to 6 January 1835 (Fig 1.). He made a series of valuable observations of the post-Difaqane period which have been analysed in detail elsewhere (Humphreys 1972:66-73). Only a few points will be highlighted here. What is of particular note is the fact that he does not appear to have recorded any signs of activity which could be associated with the Type R settlements. As already pointed out, this has led to the assumption that they had ceased to be occupied by the time of Smith's journey. Of most relevance for present purposes, however, is his account of other activity in the Pramberg area. While it is not possible to pin-point his observations with complete accuracy, the people and settlements he encountered can be located with some degree of confidence. On 1 January he left Blauwe Bank at sunrise. The geological formations which gave rise to this name are clearly visible today so this can be accepted as a fixed point. After 3 hours he encountered a group of Bushwomen (no men) whom he described in great detail. These women (who had crossed the river for the

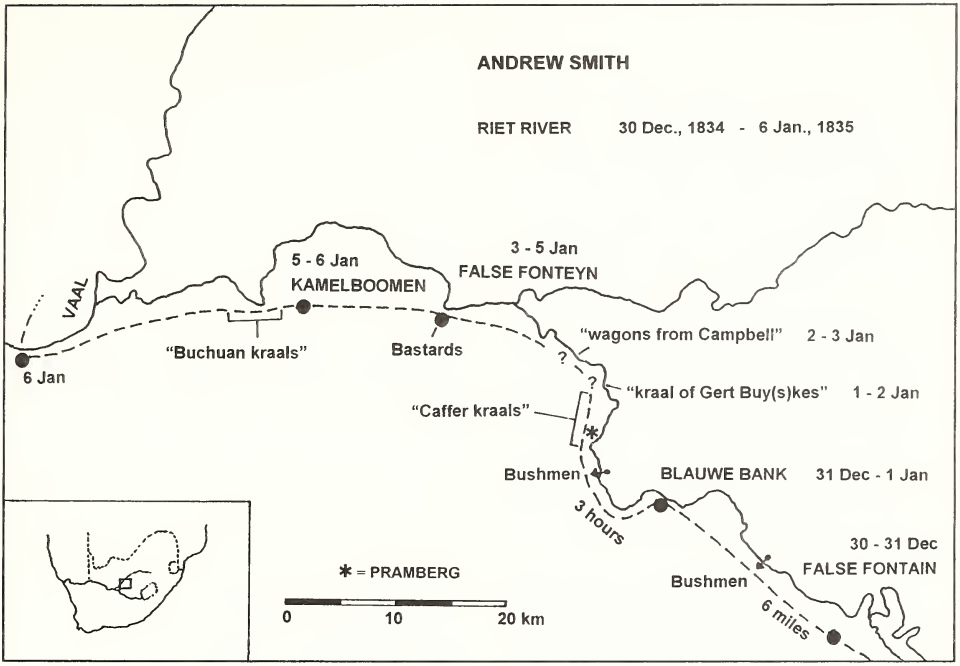

Fig. 1. Map showing the route along the Rier River followed by Andrew Smith. Dates indicate overnight stops while the names represent the approximate positions of the various groups met along the river.

day) must have been very close to, if not actually on, the present day farm of Khartoum on which occur some Type R settlements (Humphreys 1972, 1973). This suggestion as to the meeting point is based on Clement's (1967:92) estimate that in a wagon "a normal speed of 2 - 2½ miles per hour could be maintained for eight hours (*i.e.* 16 - 20 miles a day) when spread over two or three scofts and three miles an hour was possible in very easy conditions". By the evening of 1 January Smith had reached "the kraal of Gert Buykes (Buyskes)" which can only be located rather tenuously by further extending Clement's estimate of the speed of wagon travel. Of more immediate interest, however, is the fact that along the way he encountered "several small kraals, some of Caffers under the protection of Cornelius Kok, this being a portion of the country given up to him to govern". These kraals might have been occupied by Xhosa rather than Tswana because the latter are referred to specifically further down the river as 'Buchuan' (Fig 1.); Xhosa are believed to have been in the general area from at least the mid 1790s (Anderson 1987). Whatever the limitations of calculations based on Clement's formula, there can be no doubt that these "several small kraals" must have overlapped very considerably the Pramberg area under consideration here.

Combining the archaeological evidence and Smith's historical record, therefore, it is clear that a range of settlement combinations must have existed around or on Pramberg over a relatively short period of time. These include the apparently recently abandoned Type R settlements, the kraals of "Caffers" under the influence of the Campbell Griqua, Gert Buyskes (probably also under Griqua influence) and the Bushmen of the area who, from Smith's evidence, were used to 'passers by', as well as "Boers" who lived along other parts of the Riet. Each of these groups of settlements, and the cultural influences associated with them, must have left their own particular signatures. These have not been recognised and accommodated in the existing model of activity along the Riet River. The question is, to what extent is relevant evidence beginning to emerge?

ARCHAEOLOGY IN THE PRAMBERG AREA

Following heavy rains in 1988, Brink *et al.* (1992) undertook rescue excavations at Pramberg. In the course of this work, they recovered three human skeletons. The graves appear to be related to the general burial pattern established for the area and so, in the absence of further detailed physical examination, add little to our knowledge of this aspect of the archaeology of the Riet River. Of potentially greater significance, however, is a midden located in Area T as documented by Brink *et al.* (1992) which yielded a faunal sample as well as a range of Later Stone Age artefacts. This midden was not associated with

any of the Type R settlements located at Pramberg but was situated in an apparently isolated position. A major problem in the research on the Type R settlements in general has been the absence of any associated middens or, indeed, of deposits of any notable depth within the settlements. The faunal samples from settlements obtained by Maggs (1971) and Humphreys (1972) were diffused through the excavated deposit and consequently relatively small. As Brink *et al.* (1992:60) remark, these samples "show a very limited taxonomic range and probably give a distorted picture of the subsistence strategy adopted". Maggs (1971:56), however, concluded that at the Type R settlement designated OFD 1 cattle and small stock supplied the majority of the protein food. Brink *et al.* (1992), on the other hand, suggest on the basis of the Area T midden, an essentially hunting economy supplemented largely by cattle and to a lesser extent sheep/goat. While this new sample hardly clarifies the range of subsistence strategies along the Riet, it does show that various combinations of faunal remains occur at localities along the Riet. These variations could be related to seasonal differences if they were to be shown to be contemporary or, more likely, to cultural preferences or emphases given the archaeological Type R record and the historical context evident from Smith's writings.

Other recent work by Dreyer (1996) in the Pramberg area has even more direct implications for the Riet River settlement patterns. Dreyer (1996) has described what he calls "a natural occurrence" which resulted in vitrified clay rubble which, he suggests, could be confused with 'slag' from Iron Age sites. This occurrence could, however, be interpreted in another way. Elsewhere Dreyer (1992:265-6) has emphasised the fact that research on Iron Age settlements (and, by implication presumably, Type R settlements as well) has tended to concentrate on visible stone structures and ignore structures that might have been made of perishable materials thereby resulting in a distorted or incomplete reconstruction of the entire settlement pattern. Maggs's (1971) work at OFD 1 established the existence of a series of post holes and although he was unable to identify the nature and shape of the structure concerned, his evidence did show that perishable structures had been erected in some sort of combination with the stone walls which characterize the Type R settlements. The archaeological detection of the existence of perishable structures along the Riet River could thus lead one to suggest, contrary to Dreyer's view, that the narrow semicircle of burnt reeds, some 2.5 m in diameter, was the result of a fire not among naturally occurring reeds but one which destroyed some sort of reed hut construction. The fact that this particular structure was not associated with any stone ruins would suggest, further, that it was part of a different type of settlement structure - one possibly associated with one or other group like those recorded by Andrew Smith on his journey.

Yet another angle on activities along the Riet which is pertinent to the present discussion is emerging from the work of Jacobson *et al.* (1994a) where PIXE analysis of pottery samples is providing insights into a range of cultural influences. Indeed, they remark, echoing a view expressed by Humphreys (1988) and in line with the thinking behind these comments, that "variability in pottery might ... better be approached in terms of a multi-cultural regional 'mosaic' than by way of the bounded ethnic or techno-economic units of study that have characterised much past research" (Jacobson *et al.* 1994a:240). The 'multi-cultural' character of pottery from a range of Type R sites away from Pramberg has already been demonstrated in another paper by Jacobson *et al.* (1994b). In this work they show that of the three of the rare decorated sherds from Type R sites sampled, two are of local manufacture while one "is likely to be an import from the north". They suggest, moreover, that the two were "locally made in imitation of the northern styles" (Jacobson *et al.* 1994b:903). This interpretation carries with it the implication not only of simple trade or barter but actual cultural interchange. It would thus appear that a degree of complexity comparable to, but different from, that evident from the historical record existed during Type R settlement times but that this complexity has yet to be untangled.

CONCLUSION

As even the limited historical record left by Andrew Smith demonstrates, the Riet River area was one in which complex cultural interaction and interchange took place. The recent work outlined above shows that it might be possible to develop a more detailed model of interaction along the Riet based on sound archaeological data. It is to be hoped that further effort will be expended in this direction for here is an area which could become a prime example of a more socially rather than technologically driven explication of the past. To repeat again the words of Van Riet Lowe (1931) with reference to the Type R settlements, it "is a field pregnant with potentialities".

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NOSE-BLEED IN SHAMANS AND ELAND*

F.G. BUTLER

122 High Street, Grahamstown, 6139

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ABSTRACT

As a result of a re-examination of the ethnographical evidence for nose-bleeding during trance dancing, the author proposes that it was not an automatic accompaniment of entry into the state of trance (as is widely believed), but that it was induced by the deliberate insertion by the dancer of powerful snuff into his nostrils. It is further suggested that the technique was also employed by shamans/hunters to induce nose-bleeds in the eland the "totem" animal of the San over much of southern Africa.

THE DANCE OF BLOOD

The most influential single piece of evidence is from the French missionaries, Arbousset and Dumas (1846) who discuss a San dance which was so violent that it is "not unusual to see someone sink to the ground, exhausted and covered with blood which pours from his nostrils; it is on this account that the dance is called *mokomo*, or the dance of blood" (*ibid*. 246-7). There is a clear cause and effect relationship implied between the physical exertion of the dance and the nose-bleed. Unfortunately there is no close-up, in this important piece of the ethnography, of the commencement of a nose-bleed.

However, in this review it is shown that medical evidence is against any amount of exercise starting a general nose-bleed in humans. Readers will find it difficult to recall extensive nose-bleeds caused by mere physical exhaustion in screenings of even violent sports or of the Comrades Marathon. The medical literature on the effects of violent exercise simply does not mention nose-bleed. For instance, Torg *et al*. (1990) deals with nasal fractures among facial injuries common in many body contact sports. Drax *et al*. (1985), in what must surely be an authoritative work, has only one index entry under nose 'breathing'. Under "effects of dynamic exercise" (*ibid*. 42) no mention is made of nose-bleed.

Lewis-Williams & Dowson (1994:211) states that "we know from the ethnography that nasal haemorrhage was experienced by trancing shamans". The trance state itself seems responsible for this medically inexplicable physiological symptom. The head-on collision between medical and ethnographic evidence leads to an re-examination of the latter.

BLEEK AND NOSE-BLEED

In his article on "Ethnographical evidence relating to trancing" and 'shamans' among the northern and southern Bushmen Lewis-Williams (1992) refers us to four passages in Bleek (1935; 1936). The references all involve that key clue to the interpretation of rock art - nose-bleeding. Only the briefest summaries are possible.

The first account (Bleek 1935:34) is of a battle between rival sorcerers, of whom the better cures the patient by healing an internal wound, which means inhaling or sniffing his opponent from the body of his patient, and then sneezing him out.

> There was a real wound where the other sorcerer was. Of that wound the (good) sorcerer wishes to cure him, that it may not stand open.
>
> Therefore, he is wont to rub the man's wound with his nose. We do not see the wound, for the man's skin is over it. But his nose goes into the man's body to the place underneath. His nose sews up the mouth of the man's wound, where the other sorcerer had eaten of the man's flesh inside.
>
> When he has finished curing him, he takes the blood in which he had sneezed out the other sorcerer, and paints the man who is ill with it, with blood from his nose.

That probing, rubbing nose is presumably being encouraged to bleed, but can mere rubbing cause a nose-bleed? The blood from the nose, however, has curative properties, and the patient is painted with it. In the second account (Bleek 1935:12):

> When a sorcerer is teaching us, when his nose bleeds, he sneezes the blood from his nose into his hand, he makes us smell the blood...etc.

That sounds unequivocal enough. But a sneeze is not something that fits easily into a deliberate "teaching"

milieu. "He sneezes the blood from his nose into his hand". It is possible that the hand has first induced the sneeze. This is not the involuntary sneeze all experience, it is a sneeze that can be, and is, taught. It suggests that sorcerers (shamans?) may be a class or group that have secrets which are taught to suitable acolytes.

In the third case (Bleek 1935:9), that of a female sorcerer, the narrator admits that the bleeding has been induced. She "snores" the patient, taking something out of her liver and leaves the hut to lie down outside with it...

> She comes back in order to heal the hole from which she had taken 'the thing' while blood came from her nose (she cut the thing out of her nose when she went outside).

At first perusal, the fourth reference (Bleek 1936:137) does not seem relevant to the trance dance. It was no doubt a profound parable about brothers and sisters and rain. "And his younger sister smelt the springbok bush and bled from the nose" - unless the springbok bush is an irritant that induces very violent sneezing.

SNEEZING

This raises the whole question of sneezing. Lewis-Williams (1981:78) reminds us:

> Among the /Xam curing involved the sniffing out of the patient's body of what was harming him "... Lloyd, perhaps following Campbell (1815:316) translates this as 'snoring'. After the medicine man had sniffed out the evil, he sneezed out the 'harm's things' which were said to resemble arrows, little sticks (a belief still held by the Kung, Marshall pers. comm.) or various animals; and as he did this he suffered a nasal haemorrhage. There are indications that this curing operation was accomplished while the medicine man was in trance (Bleek 1935:1)." (My emphasis)

In three of the four Bleek citations the blood is sneezed out. There is widespread belief in many cultures that a properly induced sneeze can expel evil from the body. For instance, in Broster and Bourn's (1981) study of Xhosa medicine, the "healing" of Novuka from a charge of witchcraft ends as follows:

> The igqirha thumped her three times on the back between the shoulder blades, and then placed a pinch of snuff on her nostrils so that she sneezed for a full minute. After the sneezing she ceased to weep." (Broster & Bourn 1981:79).

Note the use of snuff to induce the violent sneezing. It is generally accepted that Xhosa medicine owed much to the San practise (Jolly 1996) and *vice versa*.

Now in the fourth Bleek nose-bleed citation we are told that the mere sniffing of the springbuck bush causes a nose-bleed.

Scientific corroboration of the toxic effects of one of the several plants called springbuck bush on sheep is available. Watt and Breyer-Brandwijk (1962:240) give a detailed account of the experimental feeding of it to four sheep. All die. We are concerned only with some symptoms of the post mortem: "pronounced acute catarrhal enteritis", "pronounced emphysema of the subcutaneous tissues of the intermandibular region and the ventral aspect of the neck"; "pronounced hyperaemia of the mucosa of the main bronchi and trachea with haemorrhages". If these are the results of the plant in the normal digestive process, what might direct contact with the tissues of the respiratory system do?

Unfortunately, tests of the effects on rats of snuff made from *Hertia pallens* conducted by the Rhodes University Pharmacy Department have not confirmed the expectations aroused by Watt and Breyer-Brandwijk (1962).

However, Smith (1966:422), under "springbokbossie" lists not only *Hertia pallens*, but "vaalbos" *Lopholaena cneorifolia*), "kraalbossie" (*Aptosimum steingroeveri* and *Aptosimum leacorrhizum*). He also mentions "springbokganna","springbokkaroo","springbokklaver", "springbokmelkbos", and "springbok suring".

Although, as in the Bleek reference four, the nose-bleed from a mere smell might take place, a snuff could have been made, not powdered too finely, but containing small, visible splinters which served two functions.

1. When thrust or sniffed up the nose they would help to break the blood vessels.

2. When sneezed out with the nose-bleed, they would provide visible evidence of the "harm's things" - "the arrows and little sticks" - that had caused the pain, and which had been supposedly sniffed out by the shaman.

Further reference to the second Bleek quotation reveals an interesting possibility. When the sorcerer (shaman) is teaching his acolytes,

> he sneezes his blood from his nose into his hand,
> he makes us smell the blood ..."

Why must they smell the blood? Perhaps in order that they may detect the aroma of the springbuck bush. So, the Bleek ethnographic record, while not denying the occurrence of nose-bleeding during trance dance, suggests that it was induced by recourse to a professional technique which was not generally known, and had to be taught to suitable candidates.

The induced nose-bleed may strike some as detracting from the religious seriousness of the shaman's actions or presence, but this need not be so. His blood is real enough, and the effects of inhaling the springbuck bush snuff are probably extremely painful.

But, for the shaman himself, the advantages of the

suggested snuff techniques are obvious. Nose-bleed is a signal of his professional status, and, with the aid of snuff, he can go into trance without the aid of dance, particularly when engaged in his function as healer. In the first and third examples of nose-bleed quoted from Bleek (1935:12, 13) there is no suggestion whatever of the healer dancing himself into a state of trance. He has nose-bleed on tap, as it were.

BLOOD ON THE FACE

In his detailed analysis of the Linton Rock Paintings, Lewis-Williams (1988:4) describes a ritual which may have survived into the present.

> In the Linton paintings three figures have blood falling from the nose. In addition a further nine have red lines radiating from the nose across the face. This puzzling feature was recently explained by a very old, probably last survivor of the southern San ... she said the shamans bled from the nose during the dance, and then smeared the blood back across their faces (Jolly 1986, Lewis-Williams 1986a). Her demonstration of this action showed that lines of blood would have been facial lines as well as blood falling from the nose. There is thus little room for doubt that the figures with blood falling from the nose and those with red lines on the face all represent San shamans whose potency has boiled and who are in a trance.

The assumption here is that the bleeding is the result of the shamans' "potency" being raised to boiling point by the trance dance. But may they not have taken the nose-bleed snuff? A positive answer would accord well with the generally accepted view that a hand-raised-to-the-nose gesture signals a shaman supposedly entering trance. Why that gesture? Once one considers the nose-bleed-inducing capacities of the springbuck bush, and the Bleek sources of this information, it is hard not to believe that the hand contains snuff. It is worth looking at the first three Bleek sources once again. There is no mention of dancing and nose-bleeding, only of nose-bleeding and healing - that is, in circumstances where the blood might be sneezed into the hand, and smelt, and examined by the patients, who would see the "arrows" and "bits of wood".

THE DYING OUT OF THE NOSE-BLEED AT TRANCE DANCES

San witnesses (*via* D Bleek) support the probability that nose-bleeding was not something that trance dancers were subject to, but something they induced when they were ready to "die", or needed blood for healing purposes.

Katz (1982) gives us several detailed and vivid accounts of dances, and makes extensive use of the personal evidence of trancers (people who **kia**). He devotes twenty pages (*ibid*: 59-79) to reporting at close intervals the progress of an all night trance dance. There are some bizarre incidents and episodes involving physical violence which could easily have resulted in bleeding noses. But people trance dance or **kia** without the benefit of blood. Biesele, (1993:74-76) gives a general description of trance dances. No one's nose-bleeds.

What has happened? There is no doubt about the fact that bleeding from the nose was widely witnessed (in fact, practised) at trance dances in the past. Why had it gone out of fashion?

It is possible that, in inducing a nose-bleed, the shamans or trancers were originally simulating the last stages of the familiar running down of an animal. Such running down stopped fairly abruptly in most of South Africa early in the 19th Century, when San society was deliberately destroyed and game became scarce, except in the far Kalahari and East Griqualand. Dorothea Bleek (1928), in her account of the Nharon of the central Kalahari, makes no mention of nose-bleeding.

ELAND NOSE-BLEED

It is generally accepted that the eland is the most commonly depicted animal in Southern African rock art. During the last third of this century, students of rock art have come to believe that it was not merely hunted for the meat its huge body could supply, but for spiritual power it imparted during its dying. This potency was present particularly in its blood, the material vehicle of its life, and the medium which the shaman/artists employed to mix the paints with which they depicted animals, notably eland; and that such pictures continued to exert spiritual influence on those who looked at them. The hunt of such a quarry was thus an ordinary affair, but had a profoundly "religious" character.

In an attempt to interpret a group of puzzling paintings it is suggested that such hunts (as with all such hunts) were organised by leaders, who were most probably shamans, supported by companions who shared a common ritual, certainly a common dance. It is suggested here that there is evidence that chief huntsman/shaman sometimes wore a special costume, as may some of his colleagues although this is disputed by Lewis-Williams (1981:71). In support of this we have a copy of a painting by Stow and Bleek (1930, fig. 57) identified as a hunting group by an old Bushman informant (Fig. 1).

Before proceeding, however, attention should be drawn to San awareness of the power of the sense of smell, both to attract and to repel. They used a scented herb(s) called buchu to make themselves attractive. They believed that animals had sense equipment similar to their own. This is a key to the understanding of a famous painting in the Maluti Mountains first traced by Orpen (1874) and then by Vinnicombe (1976).

This is obviously not a "realistic" painting. It is a painting of a shamanistic visionary hunt, the explanation of which was provided by Orpen's San informant, who said that shamans used buchu to attract the rain bull. In Yates *et al.* (1990, fig. 25) the "bull" in the foreground

Fig. 1. A painting of hunters by Stow and Bleek (1930).

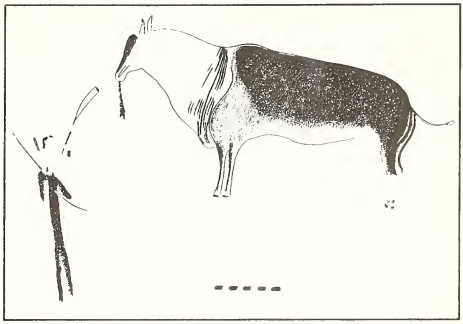

Fig. 2. An eland, apparently bleeding from the nose, with a hunter extending a rigid wand-like object towards its head. (Vinnicombe 1976:346, fig. 247).

is clearly responding to the scent (look at the nostrils) of the "buchu" plant? soaked skin? held in front of him. This raises a question. Would shamans employ hunter tactics in visions which did not have some sort of precedent in actuality?

Two points are to be noted. The animal is a rainbull, not an eland. Second, its posture suggests that it is moving forward, attracted by the scent of something offered by a kneeling unaggressive figure. This figure seems to be wearing a cloak. In the background we see a successfully captured rainbull being led by several figures, the first of which has an odd headdress and a winged cloak. Smell or scent certainly seems important in this painting of a vision. Neither of the rainbulls is bleeding from the mouth or the nose.

This use of buchu or other scented substance to attract visionary rainbulls forms a revealing contrast with several paintings in which a hunter/shaman extends a wand, flywhisk or merely his hand to the nostrils/mouth of what is quite unmistakably an eland, who is stationary, or retreating, bleeding or emitting mucous from the mouth/nose region.

Figure 2 is a detail of a painting reproduced by Vinnicombe (1976) in which an eland, unwounded, but bleeding from the nose and not under attack, is approached from the front by a man with bow and arrow and a curious long staff.

The possibility that the wand-like object contains *Hertia pallens* or a similar poisonous herb to encourage the bleeding must be considered. It has been suggested that the wand-like object may be a fly whisk, however it is probable that in this picture it is not whisking flies away, but inducing nose-bleed.

The same action is presented in Vinnicombe 1976:349 fig. 248. In this case the figure is clearly in a distinguishing costume, possibly of a therianthropic kind as witnessed by his headgear of horns. He is a shaman. There is no obvious blood, but a suggestion of mucous.

It is possible that this is a shaman's trance vision. The following alternative scenario is proposed for consideration.

The eland is a huge animal and easily run to a standstill, helpless when exhausted, unable to use its horns. There might have been special merit in killing an eland by running it down, without spear or arrow. The only disadvantage of this method is that there might be no sacred blood available to signal the death and to smear on the hunter's or hunters' face(s) to symbolise their participation in that death. To guarantee that there is blood available, and to encourage the nose-bleed, the chief hunter/shaman approaches the exhausted beast from the front and places some toxic soaked absorbent material in front of its nose and mouth. One advantage of this, from the shaman's point of view, is that it would demonstrate his powers in a spectacular fashion.

The technique could be used in addition to the normal weapons of bow and arrow, as demonstrated in the Figure 3. This could depict the final stages of an eland hunt. One unarmed hunter is kneeling at the bleeding head of the eland, possibly applying the "snuff" to encourage the bleeding, possibly to collect blood for smearing purposes. His other hand is holding the eland between the horns. Another seems to be stabbing the eland. Blood seems to be dripping from its neck and chest. A third is climbing onto its back. These three hunter figures are all wearing cloaks. The two figures in the background are cloakless, do not seem to be armed, and may be bleeding from the nose. The face of one may be darkened by blood smear, but may not be human at all. Their abnormal postures suggest the abnormal world of trance dance. They may not, in fact, be part of this picture. They are facing the wrong way, and are dressed differently.

Perhaps the best evidence for the use of snuff to cause or encourage nose-bleed is from Camp Siding, Tylden District, Eastern Cape (also reproduced in Townley-Johnson 1979:39, fig. 35) (Fig. 4).

The eland is on its last legs, staggering. The hunter is so confident that a beast in this state is helpless that he approaches it naked and unarmed. His hand is extended

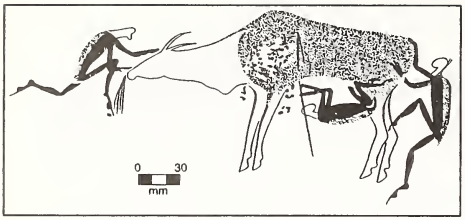

Fig. 3. A copy of a painting from the Natal Drakensberg. (Redrawn from Pager, after Yates *et al.* 1990:44, fig 21).

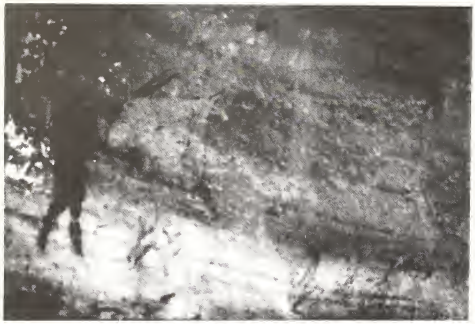

Fig. 4. A painting of a man and an eland from Camp Siding, Tylden District, Eastern Cape.

directly to the nose from which blood is being "sneezed".

This view challenges previously held interpretations of the picture. The Townley-Johnson (1979:39) caption rejects the literal views that the man is feeding a domesticated eland, or is mistakenly offering arrows instead of vegetation, and veers towards a shamanistic approach.

> "In several paintings of human figures with 'rain animals', the human holds out to the animal's muzzle objects that look like tufts of leaves. These have been interpreted as the buchu or aromatic herbs that the Bushmen believed would calm the rain animal" (Townley-Johnson 1979: 40).

This may be true enough, but does not apply here. Rain animals are seldom depicted as such realistic elands, and whatever is being offered does not look like tufts of leaves. The offering has not been accepted by the animal. This may be a picture of a hunter/shaman inserting poisoned snuff, causing nose-bleed. The animal is without doubt an eland, staggering on its last legs, not a rain animal.

But the most convincing evidence is from a painting from the Kamberg (Fig. 5). In the off-mid-foreground is an eland with a defeated posture and a white drooping head which is, it seems, being held by one hand of a hunter, leaving the other free to insert the snuff. This active figure is wearing a cloak.

Fig. 5. A painting of eland and figures from Kamberg.

Then, above this scene, and to the left, is the most interesting of all nose-bleed-inducing depictions. A fine eland, staggering backwards, is faced by a group of four figures. They are all dancing (or kneeling?). The first is holding a wand firmly in contact with the animal's nose. The next figure holds an unidentified object in one hand (a container for the expected flow of blood?). The remaining two are hand-clapping and no doubt singing.

CONCLUSIONS

It is suggested that all these pictures are of shamanistic hunters at work, either painted by themselves or artists working to their instructions. The incidents depicted are all of the employment of a technique to induce a nose-bleed in an eland to secure its sacred blood. No other animal is depicted as being treated in this familiar way. The conclusion is that this is a religious hunt of the animal most sacred to the People of the Eland.

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A TUYÈRE FRAGMENT FROM MAPHORORONG (DORINGBERG), NEAR VENTERSBURG, FREE STATE*

J. DREYER

National Museum, P.O. Box 266, Bloemfontein, 9300

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ABSTRACT

Convincing descriptions by early missionaries and travellers during the 18th and 19th century, of the smelting and smithing of iron, may be considered as circumstantial evidence for metal-working during the Late Iron Age on the Highveld. However, archaeological research in the area over the past three decades has not found any proof for these activities, although a few surface finds of ceramic blow pipes or tuyères in the Free State have been mentioned by Laidler (1936) and Maggs (1976). The present note aims to put a third tuyère find on record, describes its cultural context and summarises previous occurrences of tuyères in the area.

INTRODUCTION

Preliminary archaeological reconnaissance on the farms Jansfontein and Fraaie Uitzicht in the Doringberg area near Ventersburg was done between 1986 and 1989 (Fig. 1). The work was later extended to include the well-preserved sites in the adjacent Willem Pretorius Game Reserve (Dreyer 1994). During an intensive survey the stone-walled structures inside the Game Reserve were identified on low level aerial photographs and plotted on topographic maps (Fig. 2). The sites were investigated afterwards and the layouts described.

The overlap of Type V and Type Z settlement patterns in the Doringberg area had previously been described by Maggs (1976:41, 230, 317, 318). The different patterns inside the Game Reserve include Type V, characterised by corbelled huts and byres with connecting walls, Type Z represented by the remains of bilobial huts, and another pattern, which resembles the settlements at Doornpoort, Winburg, and consists of cattle byres without connecting walls and with no corbelled huts (Dreyer 1992). Sites located at the foot of the mountain, facing south towards the Sand River do not compare with any of the known patterns which have already been described. Ceramic ware on the surface at all the sites seems to correspond with the Type Z associated pottery assemblage (Coetsee, 1986, 1987).

THE FIND

During field work in December 1994, a single tuyère fragment (Fig. 3) was found on a flat hill locally known as Oordkoppie (28.16.47S; 27.11.43E.), which overlooks the Allemanskraal Dam (Fig. 2, site 1).

The tuyère fragment measures 100 mm from the flange to the broken end. The outside diameter at the flange is 100 mm and measures at the broken end about 80 mm. The internal diameter is between 40 mm and 50 mm, tapering towards the broken end. It can be accepted that tuyère-making requires specialised knowledge, practice and experience. In this case the surface texture of the tuyère is rough and unburnished and has no marks or decorations. From its appearance it was obviously professionally made. The clay was fired and shows patches of black colouring at the broken end. It is not clear if this tuyère was used in any iron-working process, for it contains no indication of either smelting or glazing nor any back-flow of slag. No other tuyère fragments, ore, slag or indications of metal-working were present on the site.

The tuyère fragment was found on the surface adjacent to and in association with the wall base (Fig. 4) of a bilobial hut (Maggs 1976). The particular settlement pattern at Oordkoppie fits the description of the OMB1 (Mophathe) variant of the Type Z settlement pattern (Maggs 1976:267-275, 286). In this layout the base of the clay screening wall forming the front courtyard (*lelapa*) is indicated by a double row of upright stones. In the vicinity of OMB1 near Bothaville this same settlement layout was also identified on the farm Middenspruit 151 (27.35S; 27.09E), near the Vals River west of Kroonstad (Fig. 1). The site at Oordkoppie in the Willem Pretorius Game Reserve, therefore, indicates a wider southern distribution of this specific variation of the Type Z settlement pattern.

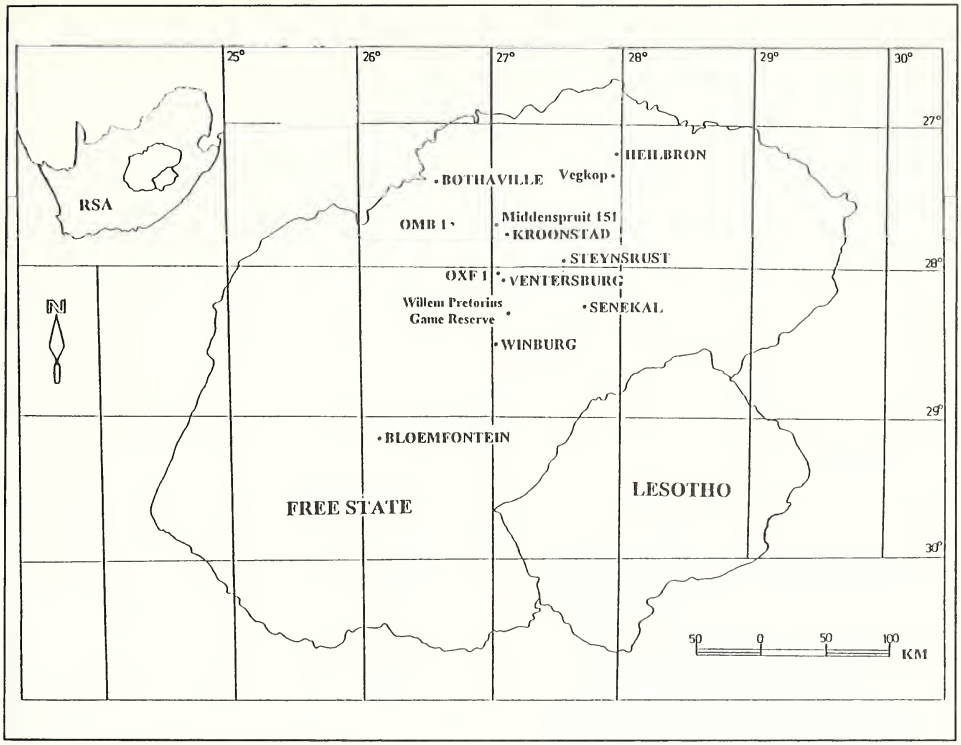

Fig. 1. Locality of places mentioned in the text.

DISCUSSION

The written descriptions by early observers of the actual smelting and smithing of iron on the southern Highveld seem to be convincing (Fig. 5), although no archaeological evidence of such activities has so far been found. (Dreyer 1997).

Descriptions by early investigators of iron implements from stone-walled sites near Steynsrust (Daubenton 1938:366) and Vechtkop (Van Riet Lowe, 1927) did not produce any confirmation for iron-smelting, nor did the extensive work by Maggs (1976). At Krugerskraal near Heilbron slag, vitrified stones and lumps of clay on a central circular fire place inside a hut were interpreted as furnace remains (Laidler 1936:28, 42). This claim for metal-working is further based on the description of a "mining gad" and three pieces of tuyère from the same locality. Maggs (1976:8, 321) did not find these investigations satisfactory and considers the descriptions and discussions inadequate. From his own research Maggs merely mentions surface finds of tuyère fragments and half-forged hoes, suggesting local smithing at Mequatling (Maggs 1976:321). Although the process of smithing has been described as being of a temporary nature (Friede & Steel 1986:82), the fact that the remnants were inside a hut does not indicate that the Krugerskraal finds were the remains of smithing either.

The find of the Maphororong tuyère fragment in a domestic context and the description of the Krugerskraal material from inside a hut, however, raise the question of preferences and taboos applicable during the smelting process. From the ethnography it is clear that in many cases strict rules applied to the smelting process, prohibiting foreigners and women, and even sometimes the King, from entering the smelting place (Küsel 1979), but it is possible that these rules were relaxed during the smithing stage.

Despite certain visible indications of such activities in our area (Laidler 1936, Maggs 1976:321), no definite archaeological evidence of iron-smelting has so far been found (Maggs 1976:123, 260, 321). We have to accept, therefore, that the source of metal objects which were used in the Free State during pre-colonial times lay either to the east in Natal, or possibly in the former Tswana-occupied territories to the north and west beyond the Vaal River. Finds from east of the Drakensberg confirm the working of iron in this area (Hall 1981:169) and before the *Difaqane* flourishing trade links existed across

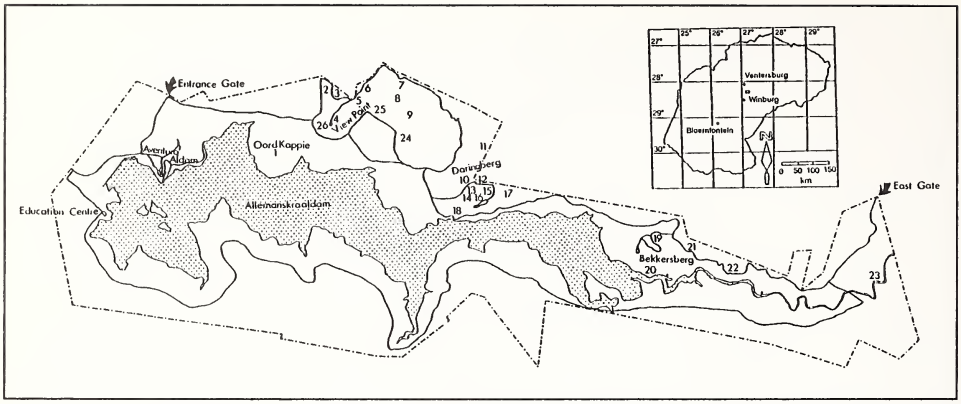

Fig. 2. Plan of the Willem Pretorius Game Reserve. The localities of archaeological sites are indicated by numbers. Number 1 = Oordkoppie.

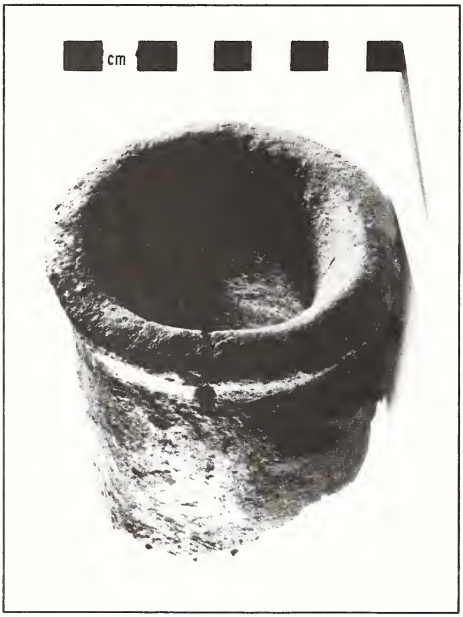

Fig. 3. Tuyère fragment found at Oordkoppie, Willem Pretorius Game Reserve, Ventersburg.

the Drakensberg between the Nguni and Sotho (Wilson 1969; Sanders 1975). This system of external trade of cattle for iron implements exploited the Basotho, who gradually became dependent on the Zulu for their supply of spears and hoes (Ashton 1967:159).

Tuyère finds from different areas have never been compared, and the relationship between Free State and trans-Vaal finds is not clear. Based on measurements only, the Maphororong specimen seems to compare with Klapwijk's (1986) Group B classification of tuyères with an internal diameter of over 33 mm and no external markings. Iron-smelting furnaces manufactured and used by Sotho/Tswana people were described and classified by Friede and Steel (1985). Single tuyère furnaces are rare, while others, with two and three tuyère inlets, occur more frequently. Structures with no obvious tuyère inlets are also found in the area across the Vaal River (Friede & Steel 1988).

The majority of furnaces discussed by Küsel (1979) from Phalaborwa, Groot Marico and Olifantspoort in the trans-Vaal, date between the 17th and 19th century. This would correspond with the occupation of the OMB1 site, which dates between the 18th and early 19th centuries (Maggs 1976:270, 275), and the OXF1 site occupied from the 16th to early 19th century (Maggs 1976:237, 246, 265, 293,). A Type Z site at Jansfontein just outside the Willem Pretorius Game Reserve dates to about 1670 AD (Dreyer 1992:355).

CONCLUDING REMARKS

Judging by the position and context of the find at Maphororong, this particular tuyère fragment obviously had no relation with iron-smelting. The unused appearance of the object and the lack of evidence of furnace remains, slag and ore in the Willem Pretorius Game Reserve, seem to point to the tuyère fragment being an isolated occurrence, probably carried in from elsewhere.

The actual locality of the find near the hut wall does not support metal-working either. Its association with the OMB1 Type Z hut type, could represent an origin from distant traditional Tswana communities, such as the Kubung, Tlhaping and Rolong to the west (Maggs 1976:293).

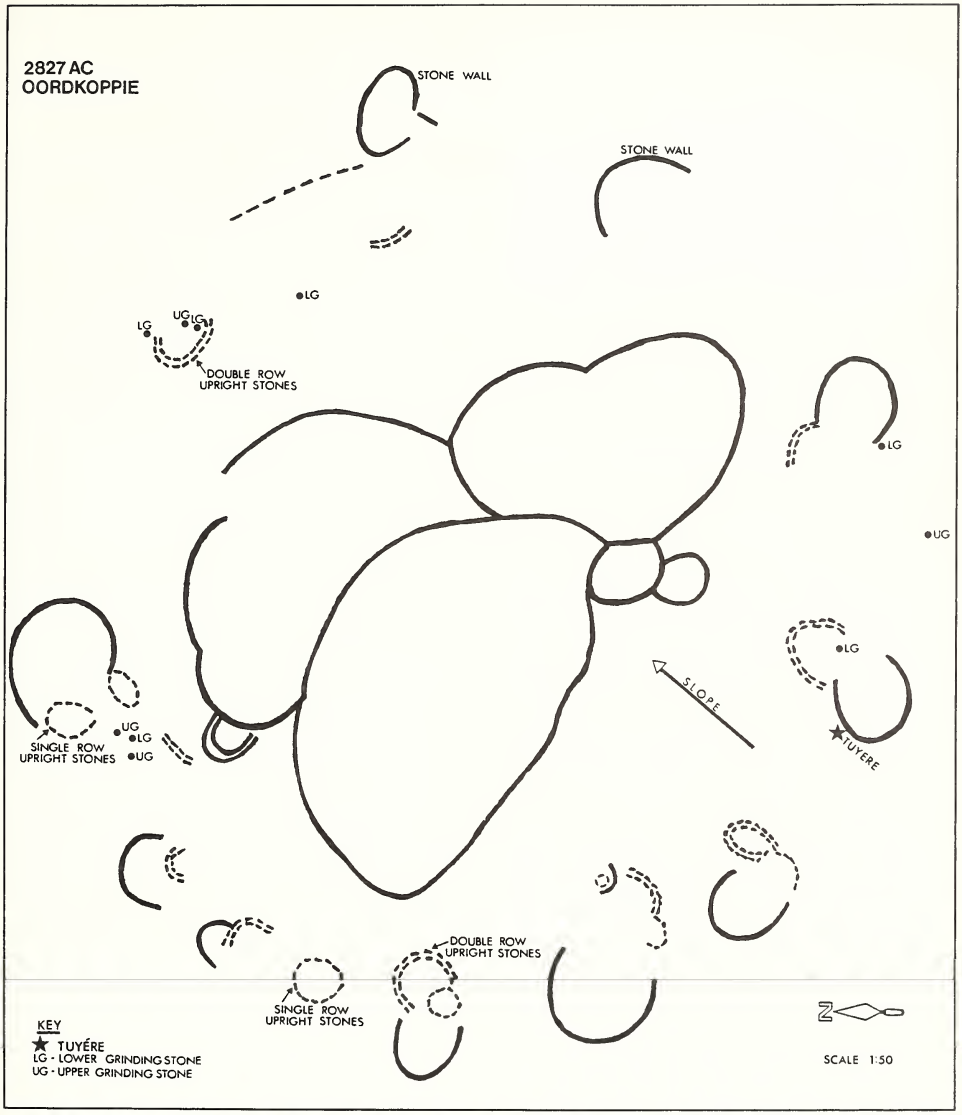

Fig. 4. Site plan of Oordkoppie. The settlement pattern corresponds with the OMB1 (Mophathe) version of Type Z layout as described by Maggs (1976). Note the position of the tuyère find.

If this tuyère was indeed manufactured at the site or in its vicinity, it could mean that iron-smithing was actually done in this area as implied by the early writers (Dreyer 1997). In this case confirmation of actual iron-working may still be waiting to be discovered on the Highveld. Future research and investigations of trace elements could possibly throw new light on the subject and may solve the question of local versus distant provenance.

ACKNOWLEDGMENTS

Thanks are due to Sandra Bishop for reading the script and Sharon Holt who prepared the maps and site plan.

Fig. 5. Boy using the bellows (Casalis 1861:131). Note the anvil stone and hammer to the right.

The comments by anonymous referees helped to improve the text.

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RESULTS FROM A TEST EXCAVATION AT THE HAVENS CAVE, CAMBRIA VALLEY, SOUTH-EASTERN CAPE*

JOHAN BINNEMAN

Archaeology Department, Albany Museum, Somerset Street, Grahamstown, 6139

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ABSTRACT

The Havens Cave (THC) was the first inland site in a series of test excavations in the south-eastern Cape mountains. The age of the basal deposits is estimated at 10 500 BP and comprise a typical Albany Stone Tool Industry, i.e, quartzite flake industry with large circular scrapers as the only formal tool type. The surface units yielded well-preserved plant material, which included a wide variety of edible and medicinal remains and an *in situ* grass lined storage pit.

INTRODUCTION

In 1981 a research project was initiated in the south-eastern Cape[1] (Fig. 1). The long term aim of the project was to investigate and to contrast socio-economic strategies and settlement patterns along the Cape St Francis coast and the adjacent Cape mountains (Binneman 1985, 1996). This paper summarizes the results of a test excavation at The Havens Cave, the first of five inland sites investigated during the 1980s. A detailed site analysis will be published elsewhere (Binneman in prep.)

Initially the inland research was aimed at establishing a time sequence for the region and to find sites with well-preserved plant material to contrast subsistence patterns at sites such as Melkhoutboom Cave and Scott's Cave. However, almost all the sites located in the Baviaanskloof/Kouga mountains only contained well-preserved plant material from the past 2000 years. This finding forced me to sample these recent deposits rather than to concentrate on long time sequences. During the early 1990s a sequence with plant preservation estimated to ca 5-6000 BP was located. Work at the site is still in progress and the results will be reported on elsewhere.

Prior to the initiation of the study, relatively little systematic, scientific archaeological research had been conducted in the south-eastern Cape, inland as well as along the coast. Only two inland sites, Scott's Cave (Deacon & Deacon 1963) and Paardeberg Cave (unpublished) were excavated, while J. Deacon (1965) had analysed material rescued from a shelter during the construction of the Paul Sauer dam at Andrieskraal. Amateur archaeologists were responsible for some work along the Cape St Francis and Tsitsikamma coasts (Hewitt 1925; FitzSimons 1923, 1926; Laidler 1947; J. Rudner 1968). In 1965 and 1967 H.J. Deacon excavated at Storms River Mouth in the Tsitsikamma National Coastal Park (Deacon 1970). At St Francis Bay Thackeray & Feast (1974) removed a burial, Cairns (1976) excavated a stone feature and Singer & Wymer (1982) excavated several of the caves and shelters at Klasies River Mouth. Since 1984 the University of Stellenbosch conducted research at Klasies River main site (Deacon 1988, 1995).

PHYSICAL ENVIRONMENT

Inland, between the coast and drier Karoo region and almost parallel to the Tsitsikamma coast are three high mountain ranges of the Cape Supergroup, the Tsitsikamma, Kouga and Baviaanskloof, separated by the Langkloof and Baviaanskloof valleys. Although most of my inland research was conducted in these mountains and valleys, The Havens Cave is situated in the Cambria valley adjacent to the Baviaanskloof (Fig. 2). The valley is drained by the Groot and Wit Rivers. The area is composed mainly of Table Mountain quartzite with outcrops of Bokkeveld shale and Enon conglomerate in the lowlands (Rust & Illenberger 1989). The vegetation is diverse and includes fynbos, valley bushveld, spekboomveld, renosterveld, grassland, Karoo scrubland and remnants of Knysna forest in the deeper valleys (Vlok 1989). The area receives an annual rainfall of between 200 mm and 600 mm. The temperatures can reach as high as 45° C in summer and drop well below 0° C in winter, with snow on the higher mountain peaks.

THE SITE AND IMMEDIATE ENVIRONMENT

The Havens Cave (33.41 S; 24.34 E) is located in the Cambria valley, some 200 m above the confluence of the

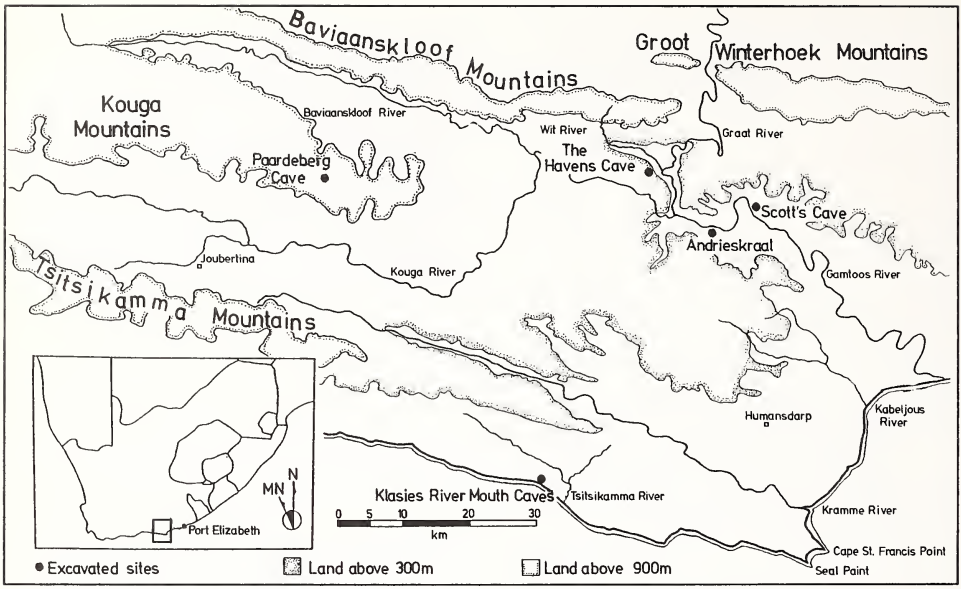

Fig. 1. Map of the south-eastern Cape indicating some of the excavated sites mentioned in the text.

Groot and Wit Rivers (Fig. 2). The cave is located approximately 20 km north-west of Scott's Cave (Deacon & Deacon 1963) and some 40 km north-east of Paardeberg Cave, excavated by H.J. Deacon (unpublished) during 1972. The cave is situated in a fold along a Table Mountain Sandstone cliff facing north-east with a scenic view of the meandering Groot River and Cockscombe, the highest mountain peak in the south-eastern Cape (Fig. 3).

The cave floor is 17 m across along the dripline, 8 m deep and the domed roof is some 6-8 m high. Numerous rock paintings, most faded beyond recognition, are visible along the domed back wall of the cave (Figs 4 & 5). There are also stubs of pegs still visible in cracks along the wall which were probably used to hang bags and equipment.

A one square metre was excavated in the southern part of the cave to a depth of 1,40 m. The deposit slopes steeply down over the length of the cave and it is evident that most of the plant remains have been destroyed by trampling. Goats have used the cave from at least 1910 to 1969 both to sleep in and as shelter against bad weather (previous owner, pers. comm.).

The vegetation on the hillside and in the immediate vicinity of the cave is composed mainly of small trees, scrubs and grasses and is similar to what Acocks (1975:58) describes as Succulent Mountain Scrub, or Spekboomveld. Along the Wit River and in sheltered kloofs in the vicinity of the cave remnants of forests are still to be found. Species such as *Podocarpus latifolius*, *Ficus burtt-davyi* and *Sideroxylon inerme* are common. The average rainfall measured since 1965 by the owners of the farm was 440 mm per annum.

EXCAVATION, STRATIGRAPHY AND DATING

The cave deposits were well stratified with alternating colourful soft and hard ash and humified and carbonised organic-rich layers (Fig. 6). The deposits were to a large extent free from major disturbances. Small scale disturbances had however been caused by wasps nesting in the soft deposits. Only the bottom 0,20 m resting on bedrock contained numerous angular pieces of rubble, giving it a stony appearance. A number of the layers and features did not extend over the excavated area, making interpretation difficult. Well-preserved plant remains were restricted to the top 0,20 m of the deposit. Apart from charcoal, a few carbonised seeds were found in the lower layers. The absence of macroscopic plant remains in the lower levels was probably due to a high degree of leaching, oxidation, humification and combustion.

Thirty two features, horizons and layers were identified and grouped into fourteen units for analysis. These are summarised from the surface to bedrock.

The surface was trampled and therefore the *in situ* bedding material was kept separate from other surface material because of possible mixing. The Bedding unit (BED) consisted of a thick layer of plant remains, mostly grass, between 150 and 200 mm thick. A storage pit in this unit has been dated to 1280 ± 50 BP (Pta-4610).

Other surface material (Unit POS) consisted of surface dust and loose grey ashy deposits with fine grass, burnt

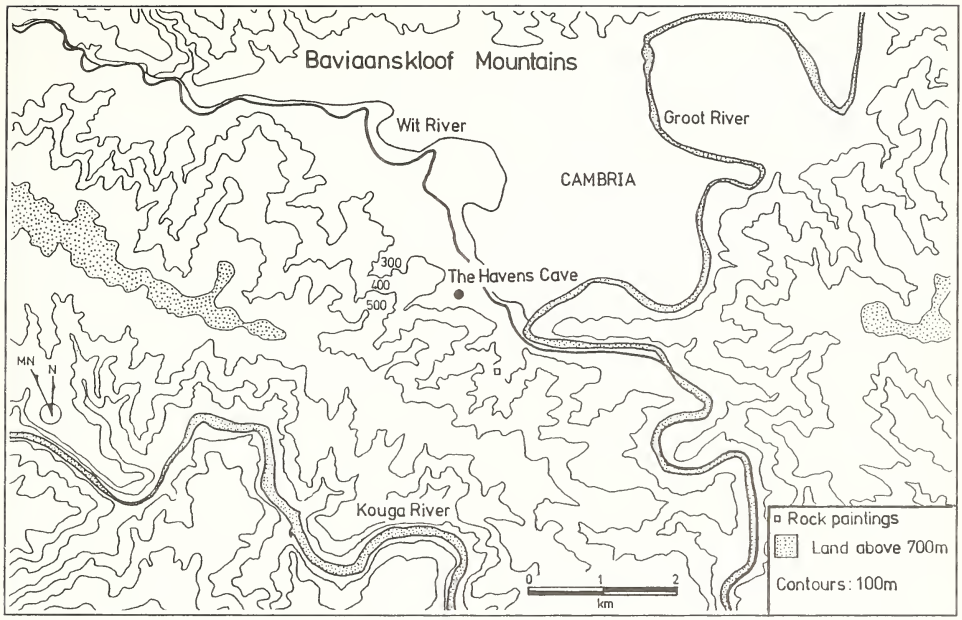

Fig. 2. Location of The Havens Cave.

Fig. 3. A view of The Havens Cave.

and carbonised grass, bark, sticks, a few corm tunics and cultural material, including potsherds. It also included three shallow, circular depressions lined with fine compacted grass remains, some 50 mm thick. Underneath the hollows were dark grey ashy deposits with burnt and carbonised grass material and stone artefacts. A burial (B), located underneath one of the bedding hollows, most probably also belongs to Unit POS.

POS was followed by unit OGA which consisted of hard, stony orange and white oxidised ash with thin dark grey ashy lenses. Two similar soft compacted white ash layers separated by a thin carbonised parting comprised unit WAG which underlaid OGA. This unit was followed by unit BOW, a brown carbonised organic layer with thin mottled ash and thin black ash lenses and soft grey deposits with white mottled ash. Unit WGA, composed of hard white leached ash (WLA) and yellow loams with mottled ash underlaid unit BOW. The next unit, VOG, consisted of black carbonised organic material and grey leached ash with a small ash feature. Layer VOL also marks the reappearance of *Nassarius kraussianus* shell and beads and has been radiocarbon dated to 6190 ± 80 BP (Pta-3917). VOG was followed by unit KOW which comprised stony oxidised sands with abundant stone artefacts and hard white leached ash. Underlying unit KOW was unit GHA which consisted of grey humified organic material, mottled ash and hard white leached ash. The underlying unit, SBA, signalled the beginning of the Wilton Industry and was composed of soft brown humified organic material, mottled ash and soft black carbonised organic material with abundant charcoal. Unit SBA dates to 6610 ± 90 BP (Pta-3913).

Unit OOA represented the end of the Albany Industry and consisted of thick layers of stony oxidised orange and white ashes. This was followed by unit BOA which was composed of soft brown humified organic soils and a thick layer of hard stony oxidised orange ash. The next unit, GOW, included soft grey carbonised organic material and a thick layer of hard white leached ash. Layer GOL was radiocarbon dated to 9790 ± 90 BP (Pta-4620). Large quartzite scrapers were the only formal

Fig. 4. A view of the inside of The Havens Cave.

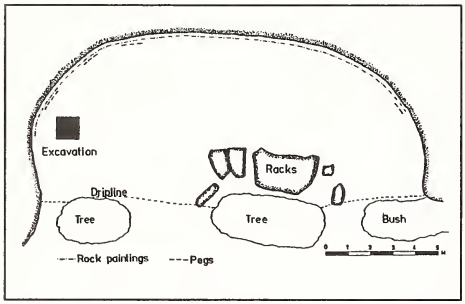

Fig. 5. Floor plan of The Havens Cave.

tools. The botom unit ROL was sub-divided into ROL 1-4 during excavation and comprised a thick layer of orange oxidised stony sands which overlay sloping bedrock. A radiocarbon date of 5820 ± 80 BP (Pta-3915) for ROL 4 has been discarded because it was too recent for the associated Albany Industry. Oxidation and leaching probably caused the incorrect result. This unit did not yield any formal tools. The stone artefact assemblage consisted mainly of quartzite flakes.

Sampling, processing and identification of the plant remains

Plant material at The Havens Cave was sampled in much the same way as at Melkhoutboom Cave (Deacon 1976:85). One bucket of unsieved bulk deposit was taken from occupation layers and bagged for analysis in the laboratory. A second method of sampling was to remove a feature or thick compacted patches of plant material *in toto* for analysis. This method makes it possible to study the material in more detail in more comfortable conditions.

All the bulk samples were weighed before being sieved through a 1 mm mesh to remove the fine sand. This removed between 60% and 80% of the inorganic component. The samples were weighed again before being passed through a 3 mm sieve to remove most of the grit and fine unidentifiable grass material. All fragile, potentially identifiable material was removed from the sieve to avoid damage. The finds from the 3 mm mesh were checked for possible identifiable material that might have passed through, such as small *Rhus* sp. seeds.

The bulk samples were sorted into different categories similar to those described by Deacon (1976:212). Identification of plant remains took place under the supervision and assistance of the staff of the Selmar Schonland Herbarium at the Albany Museum. Individual species were then weighed and quantified where possible. All other sieved plant remains were sorted for 'special finds' or remains which were absent from the bulk samples. Non-botanical remains were also recorded.

FEATURES

Features included hearths, ash bodies, a storage pit and a burial hollow. The storage pit was removed *in toto* for study in the laboratory.

Hearths and ash bodies

The hearths at The Havens Cave were small circular concentrations of black ash and abundant lumps of charcoal. The hearths were smaller than 300 mm in diameter and usually not deeper than 50 mm. The hearths were essentially isolated features with no stones or any other visible preparation and probably represent one-off occurrences.

A considerable part of the deposit at The Havens Cave was made up of ash bodies of different colours and textures. Essentially three types of ash bodies were identified. These consisted of thick, hard and soft white ash, compacted, stony orange-red ash and soft, brown and grey mottled ash.

Storage pit

A grass lined pit with a diameter of 300 mm and a depth of 100 mm deep was found in the bedding unit. The pit was made in the plant rich top layer and the bottom rested on white ash (Unit WAG). Thick grass allowed the complete removal of the lining and the contents with little loss or disturbance to the feature. The feature was removed *in toto* for study in the laboratory (Fig. 7).

The pit was filled in with dark grey soil and a wide range of food waste and cultural remains (Table 1). The opening of the pit was not sealed like some other storage pits found elsewhere in the Baviaanskloof. This fact, together with the contents, suggests that the pit had most probably been emptied of its original contents and filled in by natural accumulation of organic and cultural material.

The grass lining consisted of a fine wiry type of grass. Only the above ground grass stems were used for lining the pit. The bases and roots of the grass were removed before the pit was lined. Because grass leaves and even grass bases are extremely difficult to identify in an archaeological context, it is not known what type of grass was used as lining. *Enneapogon scoparius* Stapf. ("dassie"/hyrax grass) resembles the lining the closest of

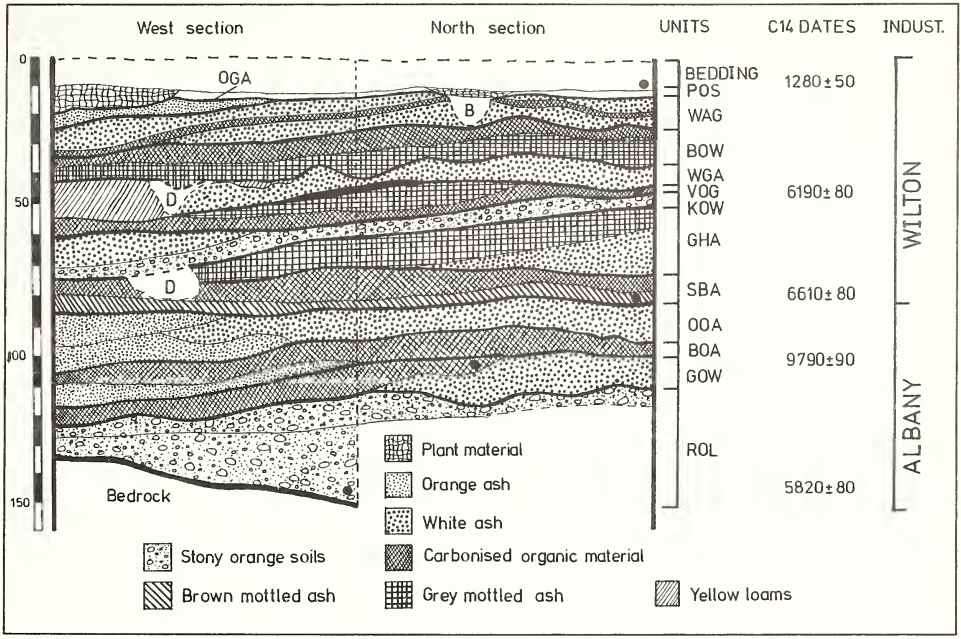

Fig. 6. Section drawing of the excavation at The Havens Cave.

all the modern day grasses growing on the hillslope.

The pit yielded some 300 *P. capensis* seeds. Other seeds found were *P. falcatus*, *Olea europaea* L. subsp. *africana* (Mill.) P.S. Green (wild olive), *Schotia latifolia* Jacq. (bush boer-bean), *Euclea* spp. Murray and *Rhus* spp. L.

Burial

Only one burial, that of an infant (possibly foetal) was found (Fig. 8). A small shallow hollow, 140 mm in diameter and 100 mm deep, was dug into a thick layer of white ash (WA1). The burial shaft was most probably dug from the overlying bedding unit. The burial was covered by strings of *Nassarius krassianus* beads (730) and some ostrich eggshell beads (18). The carapace of a small tortoise (*Homopus areolatus*) was also found with the burial (see Hall & Binneman 1987).

SUBSISTENCE AND DIET

Plant remains

The bulk of the plant remains from The Havens Cave consisted of grasses (Table 1). Three species of grasses were positively identified from The Havens Cave. *Themeda triandra* seems to be the most common grass brought into the cave. The inflorescence are easily identified and the grass bases and stems have a distinctive red colour. This grass flowers between September and December (Chippindale 1955). The other grasses identified from their florescences were *C. validus*, *E.* cf. *curvula* and *K. capensis*. All these grasses flower between early and mid summer (Chippindale 1955). The economical value of grasses, except for bedding and to line pits, was probably of limited importance. In the Transkei *E. curvula* is used as food in times of famine (Fox & Norwood Young 1982:301).

A wide variety of seeds, remains of underground bulbs, other edible plants and medicinal plants were recovered from the deposit. *Pappea capensis* were the most abundant seeds found in all the samples. Other important seeds include *Schotia afra* and *S. longifolia* pods and seeds, *Euclea* spp. and *Olea africana*. *Cyperus usitatus* accounts for the bulk of the underground plant remains. Other underground plant remains include *Oxalis stellata*, *Hypoxis* cf. *argentea*, *Freezia* cf. *corymbosa*, *Watsonia* sp.and *Moraea* sp. *Dioscorea elephantipes* remains are also well represented in the bedding unit. *Boophone disticha* is the most common medicinal plant found at The Havens Cave. Another interesting medicinal plant found was *Agathosa puberula* (buchu).

Most of the botanical remains found at The Havens Cave are known to have been used among Bantu-speaking people, and they may have had similar uses among the inhabitants of The Havens Cave. The majority of the edible plant remains were collected during early and mid summer, but there are other species present

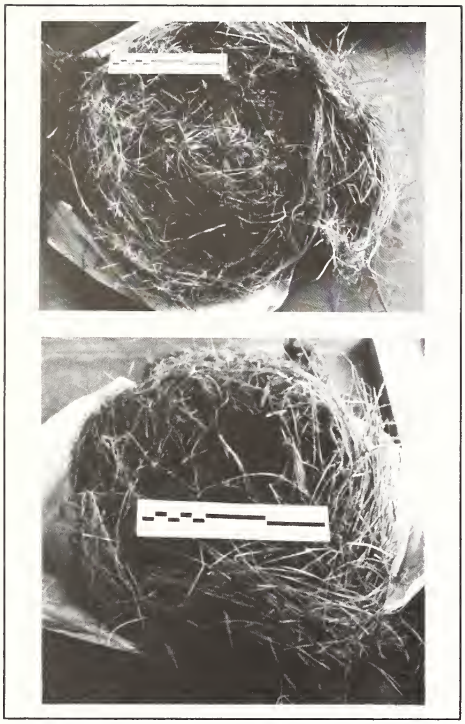

Fig. 7. The complete storage pit. View from the top (above) and view of the grass lining (below).

which suggest that the site may have been occupied during autumn and early spring. *Schotia latifolia* (available between April and August) and *Oxalis stellata* (April to June) are two plant foods which suggest that people occupied the cave through the winter months. On the other hand, both these species could have been collected at the very end or beginning of their availability. The importance and medicinal use of the plant remains will be discussed elsewhere (Binneman in prep.)

Mammal remains

The mammal remains from the Wilton units at The Havens Cave are mostly of small to medium small animals, mainly *Raphicerus* sp. and *Procavia capensis*. The Albany units show a similar trend (Table 2). Few medium large and large mammels were captured in the Albany and Wilton units. This may suggest that the emphasis was directed towards trapping/snaring rather than hunting (although this may not have been the case). The only species which occurs in the Wilton units that is absent from the Albany is *Potamochoerus porcus*. However, this may be due to the small sample size.

Fig. 8. Burial with *Nassarius Kraurssianus* beads.

Other food remains

Other faunal remains such as tortoise, other reptiles and crab are insignificant. *Unio caffer* (freshwater mussel) is present in the layers, but appears not to have been exploited in any significant quantity (Table 3). Freshwater fish vertebrae are also present in the bedding samples, but the numbers are insignificant and fish were probably not important in the diet. The fish were caught during summer (S. Hall, pers. comm.).

CULTURAL REMAINS

Lithic artefacts

Since the conventional methods and descriptions as outlined by J. Deacon (1969, 1982) and H.J. Deacon (1976) have been followed for the analysis of the lithic artefacts from The Havens Cave, no further discussion is necessary. The only difference is that all battered pieces are classified as core reduced pieces, as they represent the same processes of bi-polar flaking (Barnham 1987).

A large number of stone artefacts (23 107) was recovered from the small excavation (Table 4). Formal tools only account for 1,3% (299) of the total. Scrapers are the most important formal tool (91,6% or 274). The waste category accounts for the majority of the stone tools (98,5% or 22 759).

The most important raw materials are quartzite and quartz. Other raw materials are virtually absent. Quartzite is the dominating raw material throughout most of the sequence, except for the upper four units where quartz dominates (from unit WAG). Hornfels shows a slight increase in the Albany units, but silcrete and chalcedony are absent in these units.

The scrapers are the only formal tools recovered from the Albany units. These are large and made of quartzite. Scrapers from the Wilton units are the only formal tool class on which statistical analysis could be performed (Table 5). The scrapers from The Havens Cave differ slightly from other assemblages from the Eastern Cape proper and the adjacent Western Cape. The mean size of the scrapers was in general smaller than any other Wilton assemblage. The majority of the scrapers were manufactured from quartz (91,6%). Of these, 85,6%

Table 1. Analysis of bulk samples of plant material.

	Storage pit	Bedding		Storage pit	Bedding
WEIGHT					
Unsieved	2781,2 g.	2986,4 g.	*Grewia occidentalis*	0,1	0,1
1mm mesh	1093,8 g.	1205,6 g.	*Olea africana*	0,8	1,3
3mm mesh	950,3 g.	1010,5 g.	*Ehretia ridiga*	*	
			Diospyros sp.	*	0,1
NON BOTANICAL			*Euclea* sp.	0,7	4,3
Waste stone	92,9	120,9	*Podocarpus* cf. *falcatus*	1,2	
Stone tools	63,4	94,6	*Maytenus* cf. *heterophylla*	0,1	0,1
Pottery	11,0	3,0	*Hypodiscus aristatus*		0,2
Marine shell	0,9	2,9	*Apodytes dimidiata*	*	
OES	0,5	1,9	*Ricinus comminis*	0,1	0,5
Freshwater shell	0,3	0,8	*Enceplialartos cf. longifolius*		0,6
Bone	18,6	13,0	*Cissampelos capensis*		*
Mastic		0,1			
Leather		1,3	EDIBLE AND MEDICINAL		
Insects	0,9	2,7	*Cyperus usitatus*	0,4	0,5
Coprolites	2,3		*Moraea* sp.		
Earth lumps	3,7		Corm tunics	*	
Acatina	0,4		*Watsonia* sp.		
Owl pellets	1,4	0,8	Corm tunics	1,1	0,2
Freshwater fish	*	0,1	Corm bases	0,6	0,4
Termite casts		5,4	*Freezia/Tritonia* sp.		
			Corm tunics	0,8	1,8
PROCESSED PLANT MATERIAL			Corm Bases	1,1	0,1
REEDS	0,2		*Hypoxis* sp.		
Cut		0,4	Contractile roots	0,2	0,6
CYPERUS TEXTILIS	1,5	1,1	*Oxalis stellata*		
Cordage	0,2	2,9	Corm tunics	0,8	0,8
Netting		0,9	*Boophone disticha*		1,4
Matting	1,6		*Portulacaria afra*		
Cut/slit	*		Stems	1,8	0,4
WOODEN ARTEFACTS			*Dioscorea elephantipes*	23,4	6,3
Pegs		0,6	*Carpobrotus edilus*	0,2	
Shavings	2,9	1,2	*Gasteria* sp.	0,9	1,1
Cut	0,1	0,6	*Anthospernum* cf. *paniculata*	*	
			Agathosma puberula	0,1	
GRASSES					
Lining	129,6		LEAVES	6,0	8,9
Stems and bases	28,5	15,3			
			OTHER INCLUSIONS		
INFLORECENCES			Charcoal	23,3	7,2
Themeda triandra	*		Twigs and bark	30,9	44,7
Cymbopogon validus		*	*Aloe* sp.	0,3	
Koeleria capensis		*	Thorns	0,1	0,3
			Moss	*	*
SEEDS AND FRUITS			*Helicrysum* sp. flowers	0,1	
Schotia latifolia	1,6		*Medicargo* cf. *aschersoniana*		*
Schotia sp. pods	13,0	16,1	Misc. unidentified	6,9	4,2
Pappea capensis	18,6	7,7			

* Present

were quartz crystal. The smallness of the crystals determined the smaller size of the scrapers.

At the beginning of the Wilton period (unit SBA), the scraper length is slightly longer than in the overlying units. From unit GHA the scrapers are shorter, but the size increases with the largest measurements in units BED and POS. This corresponds with observations elsewhere (Deacon 1984:306). The width of the scrapers shows similar patterns, and are wider in the later units than the earlier units.

Other imports such as ochre, shale pieces and micaceous sandstone were well represented throughout the sequence. Edge grounded ochre pieces are only found in the bedding unit.

Non-lithic artefacts

Botanical artefacts

A wide variety of botanical artefacts were recovered from the Bedding unit (Table 6). *Cyperus textilis* Thunb.

Table 2. Mammal remains (MNI) from The Havens Cave.

	Wilton units											Albany units				
	BED	POS	OGA	WAG	BOW	WGA	VOG	KOW	GHA	SBA	TOT	OOA	BOA	GOW	ROL	TOT
MAMMALS																
Papio ursinus										1	1			1	1	2
Small primate															2	2
Small carnivore									1		1					
Procavia capensis	2			1	2	2	3	6	3	2	21	6	2	2		10
Potamochoerus porcus				1		1	1				3					
Oreotragus oreotragus										1	1	1	1	1		3
Raphicerus campestris	1										1	2				2
Raphicerus sp.		2	2	2	2		2	4	1	1	16	3	3	1	4	11
Redunca fulvorufula										1	1	1		1	1	3
Silvicapra grammia									1		1	1	1			2
Lepus sp.										1	1	1	1	1	2	5
Bovidae - genera																
small	1					1	1	1	1	1	6			2	3	5
small medium		1			1			1			3	3	1		3	7
large medium					1						1	2			2	4
large					1						1					
TOTAL	4	3	2	4	7	4	7	12	7	8	58	20	9	9	18	56

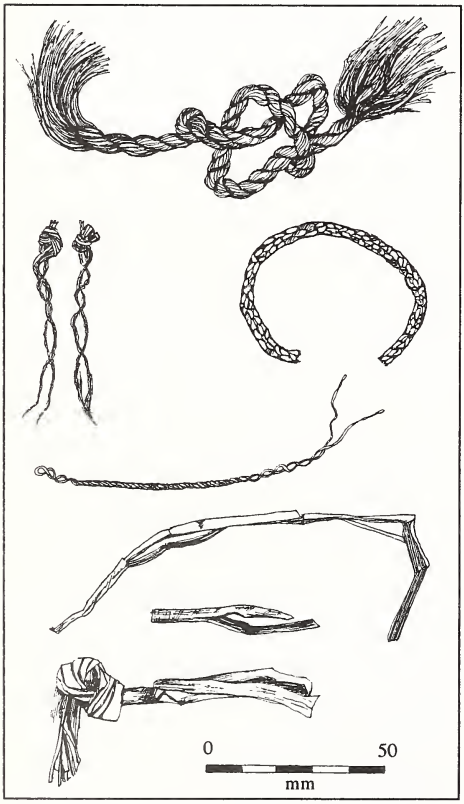

Fig. 9. *Cyperus textilis* artefacts.

("matjiesgoed") was recovered in fair amounts from the bedding samples, and is composed of fragments, cut pieces, and remains of mats and cordage (Fig. 9). Some knots were found which may have been parts of a net. This plant grows in vast quantities along the Wit and Groot Rivers below the cave. Only one seed bead was recovered. The one end of a *Hypodiscus aristatus* (*Restionaceae*) seed is ground down to expose the small hole which runs through the length of the seed.

Fair numbers of wooden artefacts were found. These included linkshafts, points, fire drills, pegs, worked and cut pieces and large numbers of wood shavings. The types of wood used for the different implements have not yet been established, but at Melkhoutboom Cave *Ficus capensis* was used for fire drills, and it is possible that the same wood was used at The Havens Cave.

The wood shavings consist mainly of chisel, and cut and tear shavings. Some rose shavings were also found (Binneman 1982). Many thick shavings, well polished with previous chisel marks still visible, are also present in the samples. These most probably came from resharpened digging sticks or pegs. The shavings were caused by sharp objects and closely resemble those created with experimental stone adzes (Binneman 1982; Binneman & Deacon 1986).

Shell remains

Marine shells, presumably used for decorative purposes, were present throughout the sequence (Table 3). *D. serra* was also present throughout, but none was turned into artefacts. Other marine shells recorded include, *H. spadicea*, *P. perna*, *P. argenvillei* and *N. kraussianus*. These were present in the Albany units, but absent in the units which mark the start of the Wilton period (6610 ± 80 BP.). These shells re-appear again in the sequence at 6190 ± 80 BP. This pattern is similar to

Table 3. Frequencies of shell, worked shell and bone from The Havens Cave.

	Wilton units											Albany units				
	BED	POS	OGA	WAG	BOW	WGA	VOG	KOW	GHA	SBA	TOT	OOA	BOA	GOW	ROL	TOT
OES																
Fragments	2	8	10	13	36	8	14	7	7	14	119	60	122	70	43	295
Roughouts	1	3	1		9	6	15				35	10	10	3	5	28
Beads	2	24*	2	1	3	1	4	7		2	46	7	12	1	1	21
Pendants	1										1					
Decorated fragments					6						6		1			1
Container apertures													1	2	1	4
TOTAL	**6**	**35**	**13**	**14**	**54**	**15**	**33**	**14**	**7**	**16**	**207**	**77**	**146**	**76**	**50**	**349**
MARINE BEADS																
Nassarius kraussianus		750*			26		1				777	18	25	29	5	77
MARINE SHELL																
Nassarius kraussianus												1	5	8		14
Donax serra				1	1	1	4	1	1	1	11	1	2			3
Patella argenvillei											1					
Haliotis spadicae	1	1									1					
Perna perna			1				1			1	2					
F. WATER SHELL																
Unio caffer		1	1		1	1	1	1		1	7	2	1	3	2	8
TOTAL	**1**	**2**	**2**	**1**	**2**	**2**	**6**	**2**	**1**	**3**	**22**	**4**	**8**	**11**	**2**	**25**
BONE																
Points					1			1			2				1	1
Awls								1			1					
Pendants							1				1					
Flakes			1	1			2				4			2		2
Polished															1	1
Cut														1	3	4
TOTAL			**1**	**1**	**1**		**3**	**2**			**8**			**3**	**5**	**8**
*Found with burial																

that observed at Melkhoutboom Cave (Deacon 1976), but the re-appearance of *N. kraussianus* shell at The Havens Cave is much earlier. It is possible that the The Havens Cave date is incorrect. A large number of *N. kraussianus* beads (730) were found with a burial. Ostrich eggshell beads and fragments were also present throughout the sequence, but only seven decorated pieces were found. Remains of ostrich eggshell water container apertures were only found in the Albany units. Beads and roughouts were more or less equally represented in both time periods, but were absent from some Wilton units. It is interesting to note that the units in the Wilton period which yielded the most roughouts (BOW, 9 and VOG, 15) were also the only other units which contained *N. kraussianus* beads.

Other artefacts

Thirteen pieces of pottery were found in the bedding unit. These include two rim pieces and one decorated piece. Only a few bone points, flakes and one pendant were recovered (Table 6).

DISCUSSION

The data from The Havens Cave generally supports observations made at other sites in the southern and eastern Cape proper. The bottom units at The Havens Cave, estimated at ca 10 500 BP, display a typical Albany stone tool tradition, consisting of large quartzite scrapers as the only formal tool. Four other sites, Melkhoutboom Cave (Deacon 1976), Rautenbach's Cave (Deacon & Brooker 1976), Kangkara Cave (Deacon 1982) and The Havens Cave were all occupied continuously from this period to possibly historical times. Paardeberg Cave was probably also occupied during the same period (unpublished report).

The mammal species captured in these units were similar to those from the overlying Wilton units, suggesting that the physical environment was also similar. The faunal remains were dominated by small species like *Raphicerus* sp. and *Procavia capensis*. This gives rise to the question whether there was any relationship between microlithic backed tools, such as

Table 4. Frequencies of stone artefacts from The Havens Cave.

	Wilton units											Albany units				
	BED	POS	OGA	WAG	BOW	WGA	VOG	KOW	GHA	SBA	TOTAL	OOA	BOA	GOW	ROL	TOTAL
WASTE																
Chips	149	1027	921	645	1166	408	1209	1828	692	722	8767	499	355	339	470	1663
Chunks	5	36	42	82	64	21	73	54	24	24	427	26	5	5	5	49
Cores	1	2	2	1	14		6	17	5		48	1	1	3	3	5
CRP	4	19	17	19	32	11	32	38	15	9	196	2		1	4	8
Flakes	115	597	750	539	1467	469	1515	2271	719	714	9158	699	514	590	669	2442
TOTAL WASTE	274	1681	1732	1286	2743	909	2835	4208	1455	1469	18592	1197	875	943	1152	4167
Waste as % of Grand Total	96,8	98,7	98,1	97,1	98,1	98,4	98,6	98,6	98,1	98,1	98,3	99,3	99,7	99,5	99,8	99,6
UTILIZED TOOLS																
Flakes	1	3	2	1	7	1	5	2	3	4	21	3	2	2	2	12
Other utilized tools																
Hammerstones					1					1	2		1	1	1	3
Hammer/rubbers								2			2					
Milled edge			1			1					2					
Ochre pencils	3										3					
TOTAL UTILIZED	4	3	3		8	2	5	4	3	5	37	3	3	3	3	12
Utilized tools as % of Grand Total	1,4	0,2	0,2		0,3	0,2	0,2	0,1	0,2	0,3	0,2	0,2	0,3	0,3	0,3	0,3
FORMAL TOOLS																
Scrapers	5	14	29	38	39	9	35	49	25	25	268	4		2		6
Adzes		1	1	1	2						5					
Backed blades						1					1					
Segments		4	1		1		1	1			5					
Misc. retouched			1		1	3		2			7	1				1
TOTAL FORMAL	5	19	32	39	46	13	36	52	25	25	292	5		2		7
Formal tools as % of Grand Total	1,8	1,1	1,8	2,9	1,6	1,4	1,3	1,2	1,7	1,7	1,5	0,4		0,2		0,2
GRAND TOTAL	283	1703	1767	1325	2797	924	2876	4264	1483	1499	18921	1205	878	948	1155	4186
OTHER																
Ochre	7	35	15	33	70	10	50	98	43	71	432	62	108	35	61	266
Shale		3	4	7	33	8	35	26	10	41	167	16	9	11	68	104
Crystals	1	6	1	19	6	21	21	5	5		85					
MSA flakes	1										1					

Table 5. Scraper length, width and height from the Wilton units at The Havens Cave.

		Length		Width		Height		W/L ratio
	f	Mean	SD	Mean	SD	Mean	SD	
POS	12	10,79	4,33	21,38	4,42	4,68	1,40	123,42
OGA	15	9,44	6,02	11,36	3,01	3,94	1,31	124,24
WAG	30	8,91	3,91	11,00	3,67	4,36	1,26	127,00
BOW	31	8,94	2,91	9,83	3,59	3,59	1,48	111,85
WGA	8	8,84	0,92	10,46	1,94	4,01	0,94	119,42
VOG	23	8,30	2,26	10,25	2,21	3,84	1,08	136,17
KOW	31	7,88	1,40	10,54	2,37	4,09	1,26	136,39
GHA	20	7,48	1,77	10,09	2,00	3,58	0,98	141,52
SBA	16	8,90	2,50	10,52	2,55	3,72	0,96	120,68

segments and hunting (see Wadley & Binneman 1995). Leslie-Brooker (1987) made a similar suggestion for Uniondale Shelter.

A wide range of plant species was exploited at The Havens Cave. Apart from the 'traditional' warmer month species, several colder month species were also present in the bedding units. These included plant species such as *Schotia latifolia* remains, of which the pods are available from April to August, *Oxalis stellata*, an underground bulb which flowers between April and June, *Hypoxis argentea* which flowers between June and November, seeds such as *Olea africana* (mature between March and

Table 6. Frequencies of pottery, leather and botanical artefacts from The Havens Cave.

	BEDDING UNIT
POTTERY	
Fragments	8
Rim	2
Body decoration	1
TOTAL	**11**
LEATHER	
Fragments	1
WOOD	
Pegs	1
Cut pieces	1
Shavings	*
TOTAL	**2**
REED	
Cut/Notched	1
CYPERUS	
Cordage	7
Matting	73
Netting	1
Cut/slit	1
TOTAL	**82**
SEED BEADS	
H. aristatus	1
OTHER INCLUSIONS	
Mastic	1
Glass beads	1
TOTAL	**2**

* Present in relatively large numbers.

July), *Euclea natalensis* (late autumn and winter months) and *E. undulata* (February to September). From this evidence it can be argued that groups stayed for extended periods at the cave, or even all year round. On the other hand, it is doubtful whether any one of these plant foods, or even a combination of them, could support a relatively large group of people for any length of time. None of these plant species occurred in the bedding unit in any significant quantities, and therefore it would appear that small groups most probably occupied the site occasionally for short periods. It is also possible that these species were collected at the very end or beginning of their cycle and therefore offer no explicit evidence for winter occupation of the site.

Cyperus usitatus and *Freezia* sp. accounted for the bulk of the geophyte remains, with little *Watsonia* sp. remains present. The former also dominated the geophyte remains at Scott's Cave (Wells 1965). At Melhoutboom Cave *C. usitatus* was found only in the top surface layers, which is equivalent in age to the Scott's Cave deposits (Deacon 1976:92). The limited time distribution of *C. usitatus* (past ca 2000 years) has given rise to speculation that there is a correlation between the collecting of the plant and the presence of pastoralists (Deacon 1993) and an indication of resource intensification (Hall 1990).

Unfortunately, the time distribution of *C. usitatus* cannot be tested at The Havens Cave. However, not all sites in the south-eastern Cape yielded *C. usitatus* remains during the past ca 2000 years, nor were *Watsonia* sp. the dominant geophyte collected (Binneman in prep.). Geophyte remains together with other food remains such as *Dioscorea elephantipes* and *Schotia* spp. clearly indicate that people during the past ca 2000 years exploited a wide range of food resources. This might also have been the case before ca 2000 BP.

This questions the above assumption of an correlation between *C. usitatus* and pastoralists. Furthermore, it also questions the statement that "... subsistence pattern ... by populations in the Cape Folded Mountain Belt was closely coupled to Watsonia ecology ... an excellent example of human adaptation to a particular plant type" (Deacon 1976:105).

The storage pit appeared to have contained mainly *P. capensis* seeds before it was filled-in with surrounding floor debris. 'Sealed' storage pits from other sites in the research area contained only *P. capensis* seeds. Storage pits at other sites in the southern and eastern Cape, Melkhoutboom Cave (Deacon 1976) and Boomplaas Cave (Deacon, H.J. 1979, 1995; Deacon, J. 1982), also contained *P. capesis* seeds.

These seeds were not only stored for their cosmetic value. Pappe (1868:3) reports that the kernel contains a fairly heavy oil which is edible, but somewhat purgative. The fruits are edible and can be made into beverages, vinegar and jelly (Palmer & Pitman 1972:1359). Wikar, a run away Swedish soldier who was the first European to journey along the Orange River between 1775-1779, noted that the tribes used the oil of *P. capensis* seeds instead of fat for rubbing themselves (Mossop 1935). They also roasted the seeds under the coals and crushed the shell to get to the kernel. These they ground to make a sweetly scented oil. He also mentions that it is also recommended as an external remedy for ringworm and baldness.

The raw materials from The Havens Cave supplied interesting information. Quartz crystals were highly preferred in the manufacture of formal stone tools during the Wilton period (the Albany layers yielded no crystals). A fair number of quartz crystals were found in all the layers, specially in the units regarded to be periods of increased social activities (units with relatively high numbers of ostrich eggshell remains and *N. kraussianus* beads, for example, BOW and VOG). Furthermore, at Paardeberg Cave in the Langkloof, some 40 km north-west of The Havens Cave, silcrete was a major raw

material (between 22% and 46%) (unpublished report), but here it was less than 0,5%. Silcrete was also virtually absent from other sites in the Baviaanskloof. This may represent a symbolic boundary between sites in the Langkloof and Baviaanskloof.

ENDNOTES

1. The region defined here as the south-eastern Cape includes the coastal and adjacent mountain regions between the Bloukranz River Mouth and Gamtoos River Mouth (Bruton & Gess 1988; Lubke *et al.* 1988). The area is intermediate to the southern and eastern Cape proper (previous geographical references have been obtained for discussion purposes)

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Southern African Field Archaeology 6: 106-107. 1997.

BOOK REVIEW

THE TSODILO JEWELLERY: METAL WORK FROM NORTHERN PROVINCE

By Duncan Miller. 1996. University of Cape Town Press. R94.95.

A. KOUSARIS

Department of Metallurgy and Materials Engineering,
University of the Witwatersrand,
Private Bag 3, Wits 2050

This is a detailed report (124 pages) on the examination and assessment of iron and copper artefacts as well as slags discovered at the Divuyu and Nqoma sites in Northern Botswana. The report comprises seven chapters.

Chapters 1 and 2 are of an introductory nature and deal with the classification and description of the artefacts. It is evident from these two chapters that a lot of painstaking excavation was undertaken and a very large number of artefacts were unearthed and classified. The sketches of artefacts in Chapter 2 are excellent and plentiful but one wonders whether a similar objective could not have been achieved at a lesser cost through photography.

Chapter 3 gives metallographic and petrographic descriptions and includes tables of chemical analyses and summaries of descriptions and artefacts. A detailed description is given for each article which entails a lot of repetition which makes reading laborious. For instance the mass of artefacts, their corroded appearance and their hardness could be restricted to the Tables. Text could be used to highlight important aspects of artefacts. The fact that the photomicrographs appear at the end of the report also makes references rather difficult.

Chapter 4 gives an evaluation and summary of the Divuyu technology while Chapter 5 is an evaluation and summary of the Nqoma material. These two Chpaters are effectively discussions of Chapter 3.

Chapter 6 makes comparisons of the findings with those from other sites and Chapter 7 contains the conclusions.

An extensive bibliography and glossary of important terms are included followed by an impressive list of 143 photomicrographs.

The report is the result of an awful amount of work and should prove very useful to archaeologists and others in the field. It should nonetheless be examined with some circumspection because it contains phraseology and statements which might confuse or mislead the novice. It itself "perpetuates" some incorrect or imprecise views and technical terms of previous researchers when reference to standard textbooks have provided more lucid expression.

A few examples may be sited. The author states on numerous occasions that the carbon content of near non-metallic inclusions in different ways (*cf.* pp 54, 58, 59). The simple explanation of this occurence is that the carbon in the hot iron continues to reduce iron oxide inclusions in the iron resulting in the decarburization of the surrounding areas.

A "glass transformation temperature" does not convey any meaning because a glass does not transform. A glassy material simly becomes less and less viscous (hard) as the temperature rises. The term has been used to explain the fragmentation of slag in metal worked below a certain temperature and their plastic deformation when working took place above such temperature. The change-over from a non-deformable to a deformable condition does not involve a transformation and depends on the details of composition.

The treatment of slag microstructures adopts a piecemeal approach which can leave the reader wondering why the microstructures vary as they do and if there is coherence between the different observations. Slag microstructures form upon solidification and cooling in a fashion similar to that observed in metallic alloys. However, the microstructures are modified by the fact that some slag constituents crystalize in non-cubic lattices. For instance, the FeO-SiO_2 combination gives itself beautifully to a synoptic treatment based on the relevant part of the phase diagram. The system forms a eutectic at 75% FeO and the microstructure of "slags" or unreduced siliceous ore lumps can supply valuable information on the process and extent of reaction. Unfortunatly no mention is made of the FeO-SiO_2 system.

The author does not explain adequately the origins of the dendritic and "smaller" wusite particles in fayalite (*cf.* p. 61 & Fig. 76). It is incorrect to say that the small wusite particles were "exsolved" within the fayalite. Figure 76 shows a beautiful microstructure of a slag containing more than 75% FeO. Solidification commenced by the formation of the primary wusite

dendrites and ended with the precipitation of the FeO-Fe_2SiO_4 eutectic mixture. This microstructure shows definitely that the material was in the liquid state and that its temperature was in excess of 1300°. The author does not draw this firm and important conclusion.

All spheroidization of pearlite was attributed to long annealing treatments after hot forming. This is not necessarily so. Spheroidization takes place in a matter of minutes when the metal is worked during transformation to pearlite. One can hazard a guess that this was probably more often the case than not.

Reference is made to hot working of copper (pp 64 & 65) and subsequent recrystallisation by annealing. Recrystallization is a pre-condition of hot working. Subsequent annealing of hot worked metal does not produce recrystallization.

The presense of martensite in a nodule (p. 68) is interpreted as evidence of quenching, perhaps deliberate, to increase the hardness. The author notes the extremely coarse gain size of the alloy but does not point out that hardness increases with the increasing grain size. Thus the martensite could well have been the result of air cooling. The simplest of methods to increase hardness and strength is by cold working. But even this process does not appear to have been used deliberately. In fact, even artefacts which required hardness were more often than not "annealed" after forming. The possibility, therefore, of deliberate fast cooling to produce martensite is very remote.

On the basis of silica inclusions in the metal it is suggested that temperatures of about 1723°C may have been reached in the smelting operations. That is unlikely because this temperature is well above the melting point of pure iron. No evidence has been presented so far to show melting of pure iron; not even iron with 1 %C or more with a liquidus temperature of about 1460°C and a solidus temperature of about 1340°C.

Further examples of inadequate phraseology and interpretation could be sited.

In conclusion it may be said that the report could prove very useful from the historical perspective and the author should be commended for his extraordinary effort. However, technological expressions and interpretations could do with re-examination.

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Johan Binneman: amjb@giraffe.ru.ac.za
Lita Webley: amlw@warthog.ru.ac.za

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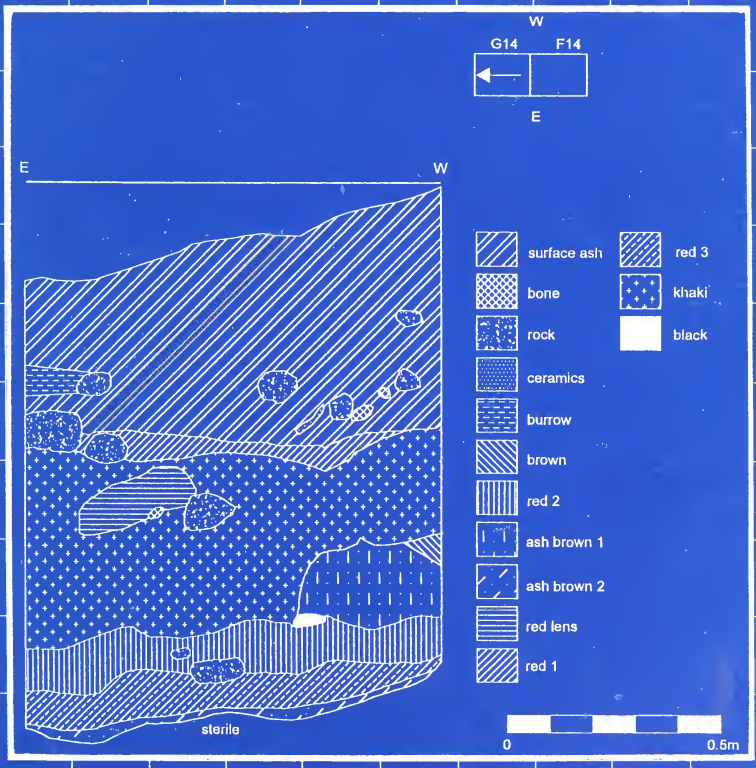

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The aim of *Southern African Field Archaeology* is to communicate basic data to professional archaeologists and the public.

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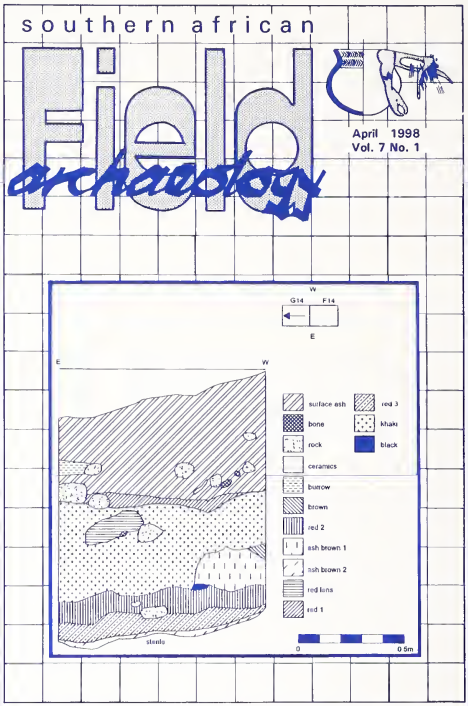

Cover illustration:
Section of the Midden 1 excavation at KwaMaza B, Ndzundza Ndebele site in the Steel Poort valley, p. 42.

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OPINIONS

ARCHAEOLOGY IN THE TRENCHES? Part II

In a recent Guest Editorial in the *South African Archaeological Bulletin*, Mazel (1997:87) wrote "... all is not well in South African archaeology". Mazel's main concern with the current state of South African archaeology is employment or more specifically the 'power base' behind the employment structures. On the one hand he cites the closure of the Archaeology Department at the University of Stellenbosch and possible similar threats to other departments, as of concern to future employment prospects in archaeology. On the other, Mazel criticises what he perceives as an imbalance between the 'centres' and 'peripheries'. Mazel identifies the 'power' at the 'centres' as being responsible for the "unwillingness of archaeology graduates to pursue careers in the peripheries". According to Mazel, at the root of this unsatisfactory situation is that 'peripheral' archaeologists are not invited to the 'centres' to present their research. If this were to happen, Mazel argues, they (the 'peripheral' archaeologists) "would significantly enrich the students' appreciation of the broad spectrum of South African archaeology".

I would like to briefly comment on the first part of Mazel's concerns, namely the closure of the Stellenbosch Archaeology Department (also Binneman 1997). I feel that the decision by the University of Stellenbosch was one of short sightedness and one which may be seriously questioned (but then we do not know the reasons). On the one hand, the university is closing a department which has dealt explicitly with the early history of the peoples of South Africa, while on the other hand, the Department of Ancient Studies is now presenting MA courses in Ancient Near East Studies ("courses for those who are interested

in Ancient Near Eastern Cultures") and in Classical Culture ("courses for those interested in ancient Greek and Roman civilisation"). I do not question the demand for these courses at that university. However, I should like to know why there is no space for South African 'ancient studies', which are becoming more and more popular and relevant everyday? Not only is the university depriving Afrikaans speaking students of the privilege of experiencing archaeology in their home language, but it is also contradictory to the 'spirit' of cultural Reconciliation and Development.

Another burning question which needs to be asked is why was the lecturing post (vacant since 1990) never filled, and what role has this played in the decision of the university.

Unfortunately there is more bad news concerning archaeology posts in addition to that of the University of Stellenbosch. It is now almost certain that the vacant post at the South African Museum will not be filled in the future. A similar situation is evident at the Albany Museum, where a vacant post has been frozen indefinitely - which effectively means that it probably never will be filled in the future.

To return to the second part of Mazel's editorial, I agree with Mazel's statement that 'peripheral' archaeologists can [and certainly do] make a significant contributions and/or even make differences to the enrichment of students perceptions of South African archaeology.

'Peripheral archaeologists' generate and add a considerable amount of new and important data to the 'pool' of archaeological knowledge. For example, it is interesting to note that of all research papers published in this journal during the past seven years (counting only first authors), 49% were submitted by researchers at museums, 29% by universities (staff 15,6% and students 13,5%), 11,5% by researchers from other institutions and 10,4% from overseas researchers.

Although I do agree with Mazel that the perception may exists among students that the 'civilised centre' of archaeology is either in Gauteng or Western Cape (whether it is "the nature of information presented to students", or not), I would like to believe that it is not deliberately created by the teachers. However, I do agree that there exist a certain degree of ignorance on the part of some university teachers regarding the nature of research taking place in the 'peripheries', and, as Mazel has correctly remarked, this can only be rectified by inviting 'peripheral' archaeologists' to present their research. An alternative would be that between SA3 meetings (which in recent years have not been well attended by university teachers), workshops be held on various topics.

Whatever the case may be, one reality is that at the end of the day we are dealing with people's choices and quality of life, when it comes to making decisions on whether they want to practice archaeology in the crime and killing fields of KwaZulu-Natal or the Eastern Cape. Hereby not for a moment suggesting that it is any safer in Gauteng or the Western Cape.

Playing devil's advocate for a moment; there is the alarming trend among senior and experienced archaeologists in recent years to leave active research posts to take-up more senior administrative positions at museums and parastatals. Is this not another form of using "archaeology to suit their own careers and political positions ..." (Lewis-Williams 1993:49; also quoted by Mazel 1997:87) and to create own power bases?

This is also of great concern, because these archaeologists leave enormous knowledge gaps which must be filled by unexperienced 'unwilling' graduates.

Johan Binneman
Department of Archaeology
Albany Museum

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Mazel, A.D. 1997. Guest editorial: thoughts on posts, provincialism and power in South African archaeology. 52:87-88.

* * * * * *

Alex Schoeman who joined the Albany Museum last year as Historical Anthropologist is now also a co-editor.

In previous years *Southern African Field Archaeology* received generous donations from the Albany Museum. Due to financial constraints this is no longer possible and **printing of the previous issue (September 1997, Vol. 6 No. 2) was made possible by a donation from the self-generated funds of the Editors.**

This issue received generous donations from Prof. Garth Sampson, Dr Peter Mitchell, Dr Duncan Miller, Mr Cobus Dreyer and the self-generated funds of the Archaeology Department at the Albany Museum. The Editors would like to thank these researchers for their support.

Due to special requests and opposition by several researchers to certain in-house rules, for example the use of mm instead of cm, which we agree is a an awkward unit to express measurements in archaeology, we have decided to follow the system authors prefer, *i.e.* as indicated in the manuscripts.

We have also received other requests from authors as with regard to general layout and grammar, for example the use artifact instead of artefact *etc.* In future, we will try to accommodate authors special preferences if they so request in writing.

Although the Editors take utmost care to limit errors to the minimum, these happen from time to time. We would like to apologise for mistakes which have occurred in the past and any inconveniences which were caused by these.

Southern African Field Archaeology 7:3-11. 1998.

DID THE SEACOW RIVER BUSHMEN MAKE BACKED MICROLITHS?*

ANGELA E. CLOSE

Department of Anthropology, University of Washington, Seattle, Washington 98195-3100, U.S.A.

and

C. GARTH SAMPSON

Human Sciences Division, South African Museum, P.O. Box 61, Cape Town 8000
and
Department of Anthropology, Southern Methodist University, Dallas, Texas, 75275-0336

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ABSTRACT

Backed microliths persist into the uppermost levels of most excavated rock shelters in the Seacow River valley, in association with European artifacts and livestock. They are absent or extremely scarce in equivalent levels of shelters in the middle Orange River, just 100 km to the northwest. If microliths were arrow barbs inserted into wooden shafts, this is not confirmed by historical sightings, which report only bone points on the tips of Bushman arrows. Bone point fragments are also common in historical levels of all shelters. The microliths are shown to lie close to, and above, European items which have been churned downwards through the deposits. We argue that these microliths were mixed into the historical levels from below.

INTRODUCTION

Although the persistence of backed microlith technology into very late Holocene times in the upper Karoo is well documented (Sampson 1972; Deacon 1976; Hart 1989; Bousman 1991; Pease 1993), its survival into historical times remains controversial. The technique is not recognizable in the ethnohistorical record of stone tool use by Karoo Bushmen (Dunn 1873, 1930; Kannemeyer 1890), but the documentary record of their lithic production is so scanty that the question can be better addressed by archaeological means.

The pioneer excavation of Hewitt (1931) at Tafelberg Hall in the upper Karoo (Fig. 1) seemed to support the view that microlithic technology had disappeared by historical times. This shelter yielded only a solitary backed bladelet among a mass of scrapers and other stone tools. Scraps of sheet iron on bedrock and at the surface indicated that the 0.6 m deep sequence post-dated European contact (ca AD 1770). Doubts that Hewitt may have lost other microliths through a too-wide sieve mesh were apparently dispelled when fine-mesh excavations at rock shelters on the Orange River some 120 km to the north (Fig. 1), produced sequences in which microliths dwindled to a mere trace in the Post-Contact levels (Sampson 1972). This microlith-free horizon was equated with the Smithfield B industry which Van Riet Lowe (1929) had described from north of the Orange River (Fig. 1), and had attributed to the historical Bushmen. In the Orange River shelters, the underlying, microlith-rich zone was dubbed the Interior Wilton Industry (Sampson 1974).

Fresh doubts arose, however, when Highland Rock Shelter, only 40 km from Tafelberg Hall (Fig. 1), produced a sequence in which backed microliths persisted in large numbers into the historical levels (Deacon 1976). Excavations at Haaskraal and Volstruisfontein shelters (Hart 1989) also produced a few microliths in Post-Contact levels, and this recurred at several other rock shelters in the upper Seacow River valley (Pease 1993). If the Bushmen of the Orange River and of Transorangia (the originally defined Smithfield B region) stopped making backed microliths before the arrival of the Dutch trekboers, it would seem that the upper Seacow River

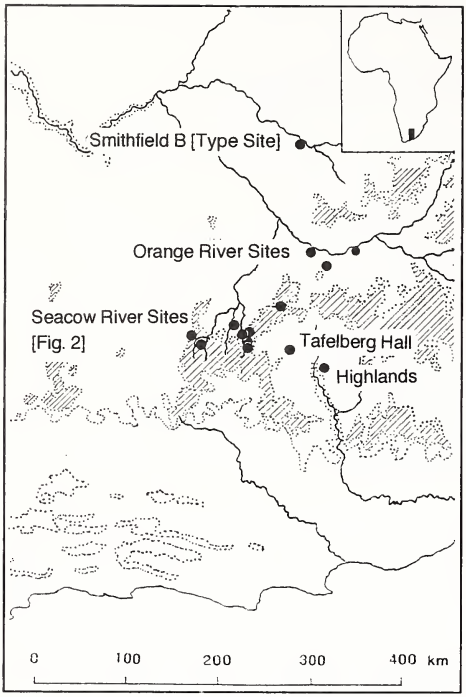

Fig. 1. Locations of rock shelters mentioned in the text; 1 000 m contour stippled and 2 000 m shaded.

Bushmen had no part in this, but continued for at least another century.

Here, we examine the contexts of backed microliths found in historical levels of eight rock shelters in the upper Seacow valley (Fig. 2), to determine whether they are actually associated with the European artifacts and livestock commonly found in those levels.

Spatial analysis of the abundant backed pieces from the underlying, Pre-Contact levels indicate clusters of production waste, including variable numbers of backed points and backed bladelets broken or discarded during manufacture (Close & Sampson in press). Although these allow detailed reconstruction of the rather unusual production methods (Close & Sampson 1998), none of them seems to have been used, except for a small sample of double-backed awls and a few arrowheads with double-backed tangs. The rest are essentially production waste.

THE SEACOW RIVER BUSHMEN

The historical levels were accumulated by local Bushmen (Neville 1996). Although they were unable to keep the trekboers out, the Bushmen were not exterminated, but found themselves various niches within 19th century frontier society. Many drifted in and out of service on the

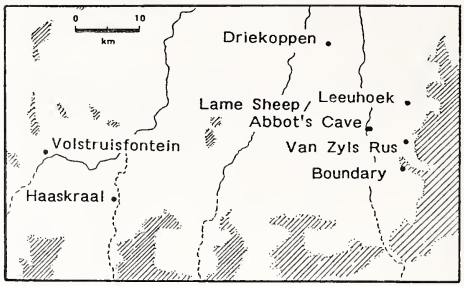

Fig. 2. Locations of rock shelters in the upper Seacow River valley; mountains are shaded.

proliferating Dutch stock farms. Some Bushman servants spent a few months of each year in their traditional hunting and gathering rounds. By AD 1810 many farmsteads had Bushman camps nearby, each filled with Bushman hangers-on, who received daily handouts of food and occasional gifts. Most of these dependents spent several months of each year in traditional hunting and gathering on the rapidly diminishing Crown Lands, not yet seized by Europeans because the spring eyes there were too weak to support a homestead. When farms failed, as they did frequently due to droughts, locusts or million-plus migrant springbok herds, the Bushmen servants and dependents simply took to the veld, supplementing their meagre diet with bouts of stock thieving.

Any small, accessible rock shelter not too far from water continued to be used intermittently by farm servants, dependents, vagrants and stock thieves, just as their ancestors had done in prehistoric times. It is these people who may have kept the backed microlithic technology alive for at least another a century after the European onslaught. Eventually, fencing was introduced and put an end to essential game movements. This and the repeater rifle combined to accelerate the extermination of the great wildebeest, zebra and springbok herds on which the Bushmen subsisted. Finally windpumps opened up the Crown Lands to permanent occupation by farmers. By 1890 the destruction was complete, and most rock shelters were abandoned. Surviving Bushmen lived on farms or in the slums of the towns, and unattached Bushmen no longer roamed the countryside.

Eyewitness accounts of arrows.

We are fortunate to have four separate descriptions of Bushman arrows seen by early travellers at various places in the lower Seacow valley. The localities of these sightings have been reconstructed by Neville (1996), and are shown in Figure 3. Their descriptions (Barrow 1806, I:229; Steedman 1835, 1:148; De Kock 1965:258; Raper & Boucher 1988, I:195) are so consistent across fifty years (AD 1777-1830) that there appears to have been little or no variation in arrow tip design. The head was

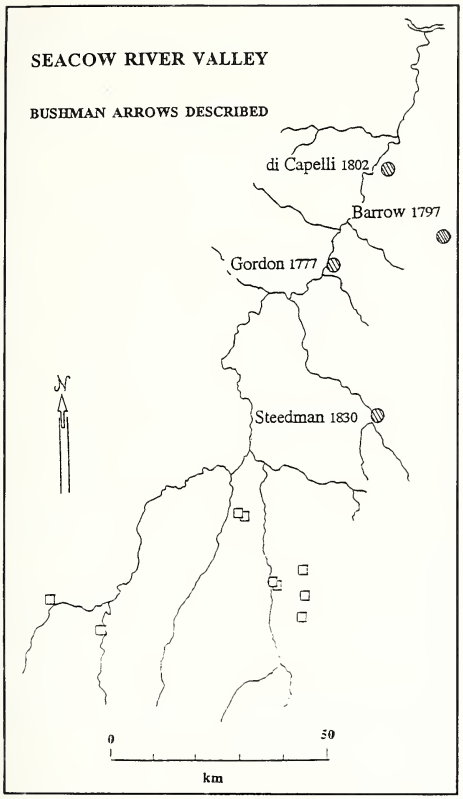

Fig. 3. Main channels of the Seacow River, showing locations of eyewitness accounts of Bushman arrowheads (after Neville 1996), and the excavated shelters (open squares) shown in Fig. 2.

invariably reported to be a detachable, smooth bone point armed only with one or two barbs made of porcupine quill, bound to the shaft. Nobody saw stone heads or barbs, although one traveller made the important observation that small triangular tips of European iron were starting to appear on Bushman arrows farther south (Barrow 1806, I:99). Consequently there is no support from documentary sources for the survival of microlithic barbs into historical times.

THE HISTORICAL LEVELS OF THE ROCK SHELTERS

This raises doubts about the stratigraphic integrity of the microliths found in historical levels of local rock shelters. Although fragments of the described bone arrow tips are common in the upper levels in all shelters (Hart 1989; Sampson in prep.), microlith numbers vary widely, and are entirely absent from some (Pease 1993). The underlying, prehistoric levels of the rock shelters are densely packed with stone artefact debris, pottery (Bollong 1996) bone arrow points, and ostrich eggshell beads, all mixed with the bones and teeth of a hugely varied local fauna (Plug & Sampson 1996). The European Contact horizon is usually visible as a thin band of glass trade beads within the mass of indigenous material. These are followed shortly in the sequence by proliferating (but low) numbers of European metal, glass and earthenware items. With time, wire fragments, gun cartridges, and corrugated iron fragments all point to the agents which finished off the Bushmen's natural habitat and food base. Traditional artifacts dwindle, while European livestock remains proliferate and become more varied (Voigt *et al.* 1995). Backed microliths are found with many of these items.

Dating ranges for the production of all the associated European items have been the focus of intensive study (Saitowitz & Sampson 1992; Crass & Sampson 1993a, 1993b; Moir & Sampson 1993; Sampson 1993; Westbury & Sampson 1993; Maggs 1994) so that the age of the uppermost backed microlith in each shelter can be inferred by these associations. There follows a brief summary of the dating evidence from each shelter.

Volstruisfontein Shelter (Fig. 4) yielded three microliths from near glass beads made between 1850-1895 and earthen wares of post-1850 and post-1860 date. There is also a style of lead grapeshot commonly made between 1840-1885. There are no microliths in the superficial dust layer, which contained a clear bottle fragment post-dating 1893, and a ribbed copper percussion cap dating to 1890-1910, all from the front of the shelter.

Haaskraal Shelter also has a post-Contact deposit with rare microliths (Fig. 5). There is a backed stub with glass beads dating to the first half of the 19th century, followed by beads of mid-19th century date. The youngest is a backed point from just below spits containing a lead bullet which post-dates the 1850's and lead grapeshot of the 1840-1885 style.

Driekoppen Shelter yielded 18 backed microliths in historical levels, all but two of which came from the loose, stony surface dust (spit 1). Although this topmost level also produced nine European artifacts (Fig. 6), another 17 European items actually come from deeper in the deposit. Its post-Contact levels start with glass beads of 1810-1840 dating range, followed by levels with a four-hole button, a cotter pin and whiteware porcelain all of which post-date 1850.

Abbot's Cave has the deepest of all post-Contact layers, almost a meter in places. The upper half of its depth is sheep-dung. The oldest European item is a French gunflint of 1810-1840 range. There is also a Brandon gunflint of late 19th century vintage, and a carriage-bolt post-dating 1865. The surface of the dung produced rubber tire parings (probably waste from boot sole replacements) that cannot be older than about 1910 when tax records show that the nearest farmer bought the first car in the district (D. Neville, pers. comm.). Eleven microliths are in apparent association with this material (Fig. 7), while three others are in the loose surface dust

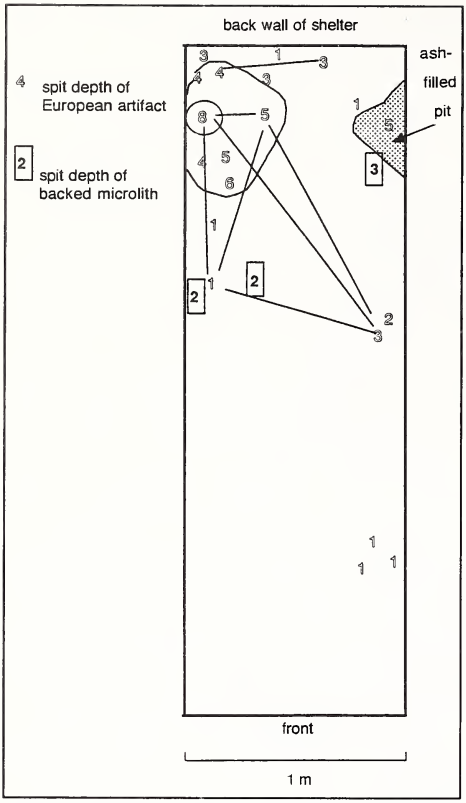

Fig. 4. Plan of the excavation at Volstruisfontein shelter, showing positions and spit depths of European artifacts (including cross mends), and uppermost backed microliths.

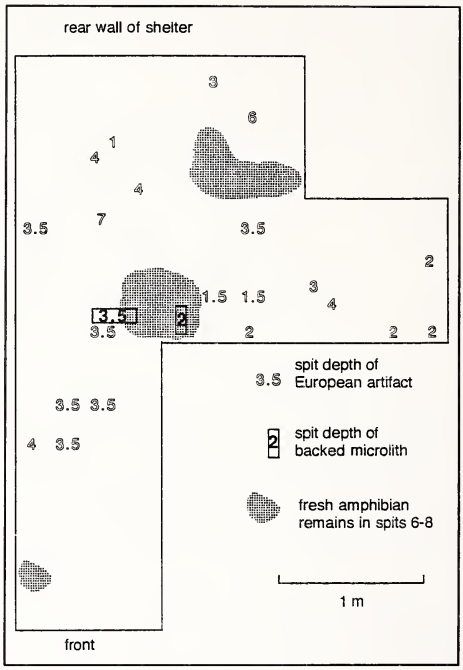

Fig. 5. Plan of the excavation at Haaskraal shelter, showing positions and spit depths of European artifacts and uppermost backed microliths.

on top of the dung,and are certainly out of context.

Lame Sheep Shelter is all Pre-Contact deposit except for its loose surface dust which contains only a peach pit and a peg of bent fencing wire. There are three microliths, two from the surface dust and one from just below the top of the sequence (Fig. 8).

Leeuhoek Shelter yielded the most European items. There is a lower unit with glass trade beads, metal items, gun flints and earthenwares (transfer printed,annular and hand-painted) tied firmly to the 1840-1860 range. Items from the overlying surficial unit include metalwork and ammunition attributable to an 1880-1910 range, although an escutcheon plate at the base of this unit may be slightly older. No microliths are directly associated with any of this material (Fig. 9).

Van Zyl's Rus has a thin, probably discontinuous covering of historical deposits with only a few items of mainly undatable metalwork, but there is an iron wire underwear clip datable to ca 1895. One microlith was found in the surface dust (Fig. 10).

Boundary Shelter contains several microliths embedded in the post-Contact levels. The base has a brass button or stud of late 18th/early 19th century vintage and a glass bead of early 19th century date. The uppermost level has metal objects attributable to the late 19th century (Fig. 11).

Overall, this evidence appears to support a case for sustained microlith production after 1850, and possibly as late as 1890 when most shelters were abandoned.

CONTEXTUAL ANALYSIS

In this section we evaluate the horizontal and vertical relationships between the apparently historical backed microliths and the indisputably historical artifacts of European manufacture. We also take note of various highly localized disturbances in the vicinity of each microlith. This is not easily done, because the dark, stony deposits appear to be unstratified and disturbances such as pits and burrows cannot be seen during excavation, which was carried out in arbitrary spits. To partly compensate for this, the positions of individual specimens were plotted to the nearest 25 cm x 25 cm block and the nearest ~2.5 cm thick spit, using procedures detailed in Sampson *et al.* (1989).

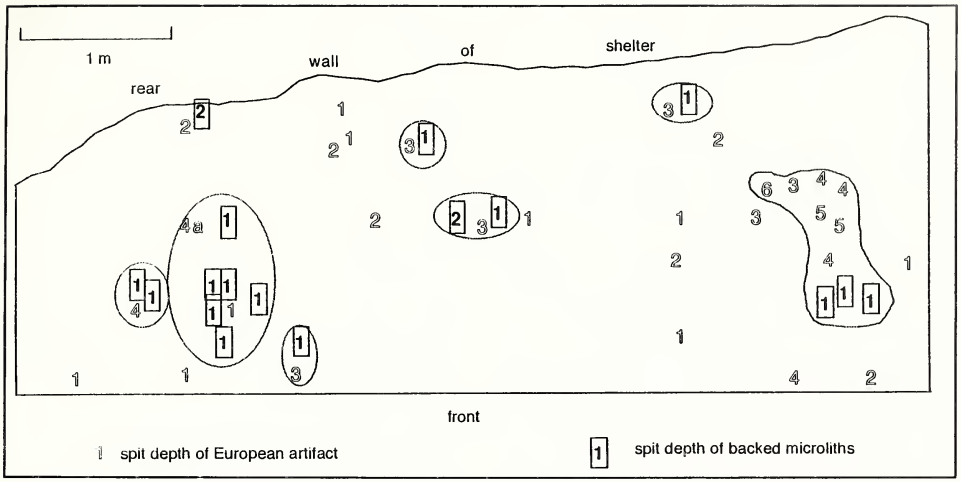

Fig. 6. Plan of the excavation at Driekoppen shelter, showing positions and spit depths of European artifacts and uppermost backed microliths.

At Volstruisfontein (Fig. 4) the three microliths came from spits 2 & 3, above and surrounding the main lens of European artifacts in spits 4-6, which contained no associated microliths. This lens has been disturbed (burrowed?) so that a single piece of teapot lid has penetrated down to spit 8, circled in Figure 4. Fortunately the patterns on this lid match with three other pieces - one in the main lens and two others which must have been kicked up by the burrowing into spits 3 and 1. Note that one of the microliths (a backed stub) from spit 2 is in the same block as the spit 1 teapot fragment, and the second spit 2 microlith is from the block next to it. It is thus very likely that they were also kicked up from below. Finally, the backed bladelet in spit 3 is from a block on the edge of a small, ash-filled pit, dug into the lower levels. This,too, must have been churned up from below. It follows that all three specimens are in highly suspect contexts.

At Haaskraal (Fig. 5) the backed stub in spit 3.5 comes from the same block as a metal boot grommet. Although the backed point in spit 2 comes from a block slightly below a glass trade bead in a contiguous block (spit 1.5) and a lead bullet (also spit 1.5), it is at the same level as a small fragment of rusted iron sheet in spit 2. The two microliths are vertically isolated: there are no microliths from anywhere in spit 4, yet they proliferate lower down in spit 5. Further doubts are raised by the two topmost microliths since they occur immediately above one of three patches of fresh amphibian bones in spits 6-8 (Fig. 5). The latter reflect recent deaths of aestivating frogs which have burrowed into the shelter deposit and failed to survive (Sampson in press). Another such patch towards the rear of the shelter is certainly related to the downward migration of three pieces of a refitted Bushman bowl, the rest of which was recovered at various depths in the historical levels (Bollong & Sampson 1996: fig. 6.). If the burrowing actions of frogs can move potsherds up and down the profile, there are good grounds for accepting that the two microliths were displaced upwards by the same process.

At Driekoppen the situation is complicated by patches with no historical cover, so that prehistoric material may be close to the surface. However, within the historical layer there are loose clusters of microliths in spit 1 at the left end of the excavation (Fig. 6). Although these are very close to a piece of window glass, they are also adjacent to two beads which are too deep (spit 4). If the beads were thrust down by some disturbance such as burrowing, it is very likely that the adjacent microliths have been kicked up from below by the same agent. The same argument can be applied to microliths in the centre/rear of the shelter and especially to the group of three at the right/front, adjacent to the large group of European items from very deep in the deposit (spits 4-6). One microlith in spit 2 near the left/rear wall is in the same block as a burnt and broken glass trade bead, in an apparently untroubled context.

At Abbot's Cave the same configuration occurs. Most of the relatively abundant European items (besides artifacts, there are also crop seeds, melon seeds, and peach pits) lie beneath the dung in a narrow band covering spits 7-9. In three places there are items which appear to have been thrust downwards into the prehistoric levels (ringed in Fig. 7), and immediately adjacent to those three places there are microliths in the European levels. One specimen appears to have been displaced upwards to the very top of the overlying dung (spit 2). Although a group of three microliths at the rear of the

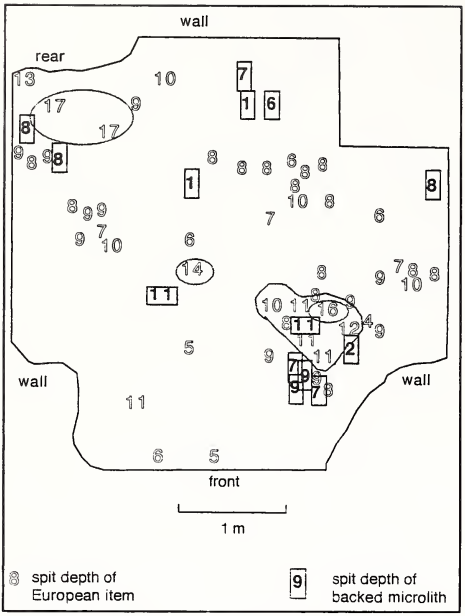

Fig. 7. Plan of the excavation at Abbot's cave, showing positions and spit depths of European items and uppermost backed microliths.

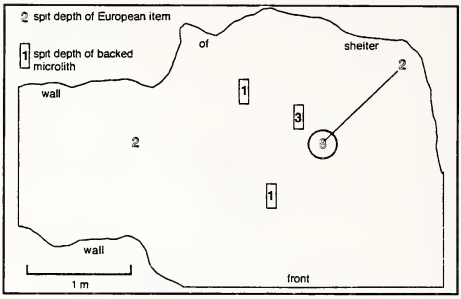

Fig. 8. Plan of the excavation at Lame Sheep shelter, showing positions and spit depths of European artifacts and uppermost backed microliths.

shelter has no immediate European associations, one of them is in the surface dust and thus is certainly out of context. The solitary specimen in spit 8 at the right margin of the excavation cannot be evaluated because there are no surrounding data.

Alongside this is Lame Sheep which, by contrast, has only a thin veneer of historical deposits with no datable items. There is also a large wire peg in spit 8 which is of similar design to the one in spit 2 (Fig.8), and has clearly migrated down the profile through burrowing. A solitary microlith in spit 3 is adjacent to this peg, and two others in the surface dust are in its vicinity and were probably also kicked out of the same burrow.

No microliths were found with any of the abundant European material at Leeuhoek (Fig. 9) although they are present in the underlying deposit. Spit 5 marks the first general appearance of European items (some refitted), but there are no superficially positioned microliths around any of the four places where European items may have been churned downwards by disturbances (ringed in Fig.9). Leeuhoek is too shallow to have attracted serious burrowing. The minor disturbances which did take place all failed to intersect any of the scarce prehistoric microliths lying close to the shallow bedrock.

At Van Zyl's Rus there are no suspicious circumstances around the solitary backed point fragment in spit 1 (Fig. 10), except that it is a lone specimen in the surface dust, and not properly sealed in the deposit. It is also vertically isolated: there is one microlith in spit 3 and another in spit 5 (below the historic levels), with several more in spit 7 and deeper.

The lens of sparse historical material in Boundary is restricted to the right rear of the shelter, so that prehistoric materials lie near the surface at the left front, where microliths were recovered up to spit 3, followed by mainly sterile hillwash (Fig. 11). Within the historical lens, the three backed microliths in spit 1 surround a group of unusually deep European artifacts in spits 5-6, ringed in Figure 11, suggesting they were dug up from below. No obvious disturbances occur near the other microliths, but we suspect there is one obscured by the baulk between the excavations, which underlay a jackal fence and could not be excavated.

SUMMARY AND CONCLUSIONS

Backed microliths are found at all depths in rock shelter deposits of the upper Seacow River valley of the upper Karoo. This includes the uppermost levels where they were recovered with European artifacts and livestock. Since these can be equated with historical Bushman occupations, it is tempting to suppose that backed microlithic technology persisted into historical times. The function of these backed points and bladelets remains uncertain, but they are widely believed to be arrow barbs inserted into wooden shafts.

However, no such shafts have been found, only bone points without slots or grooves to accommodate stone barbs. Eyewitness accounts agree that local Bushmen tipped their arrows with bone and barbed them with porcupine quills which were lashed, not inserted, on the side of the bone point. This nice fit between the documentary and archaeological records means that either microliths were used for some other purpose, or the specimens recovered during excavation are not *in situ*. Because most of the specimens lie close to, and above European items which have been thrust downwards by burrowing and other disturbances, it is reasonable to assume that the uppermost microliths are not *in situ*, but

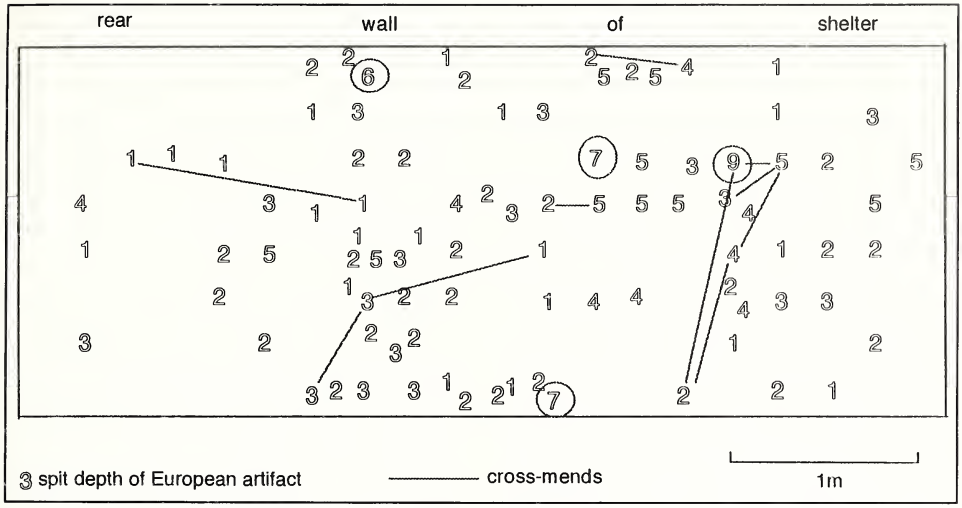

Fig. 9. Plan of the excavation at Leeuhoek shelter, showing positions and spit depths of European artifacts (including cross-mends).

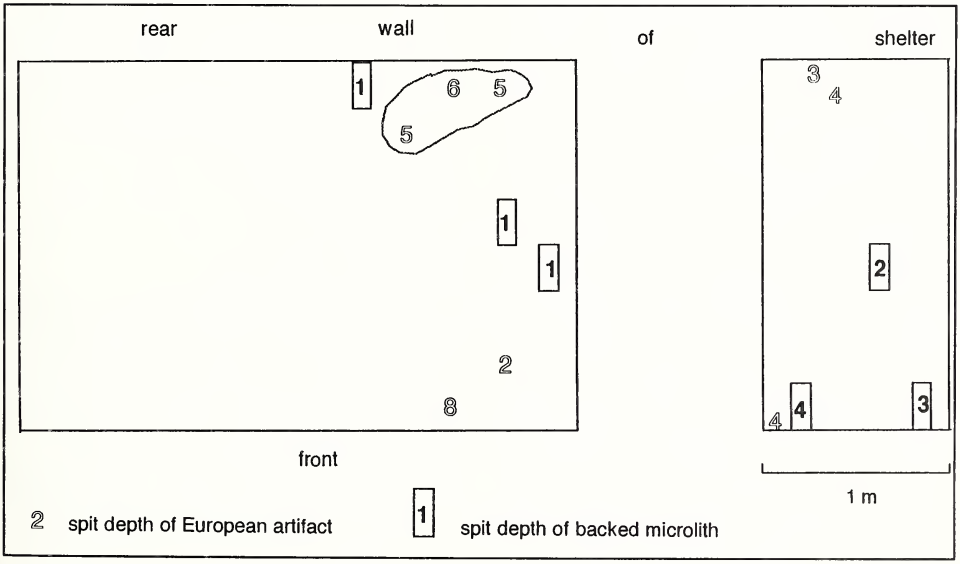

Fig. 10. Plan of the excavation at Van Zyl's Rus shelter, showing positions and spit depths of European artifacts and uppermost backed microliths.

have been displaced upwards from the prehistoric level underneath the Contact horizon.

It has long been supposed, on general principles, that cultural remains maybe vertically displaced within archaeological sites, and particularly within intensely re-occupied sites, such as caves or rock shelters (for example, Matthews 1965). In practice, however, such displacement has historically not often been considered in

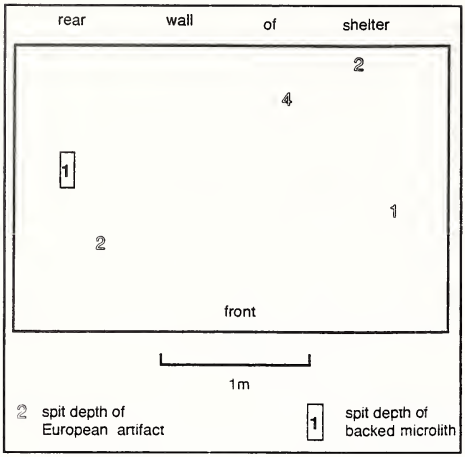

Fig. 11. Plan of the excavation at Boundary shelter, showing positions and spit depths of European artifacts and uppermost backed microliths.

even the most meticulous of excavations (for example, McBurney 1967:11-13). This is understandable, since it is only the combination of three-dimensional provenience data with refitting studies that has revealed just how far remains may be displaced. Thus, Villa's reanalysis of Terra Amata found refitting pairs vertically separated by as much as 40-45 cm of apparently intact dunal stratification (1983:69-72); Petraglia (1992:166) found "up to 76 cms of vertical displacement" in the Abri Dufaure; and Hofman's (1992) working the Duck River Basin (Tennessee) showed that similar vertical displacements can occur within less than 10 000 years. Unfortunately, refitting of the material excavated from the Seacow River valley rock shelters has not been attempted. Nonetheless, the occurrence, at Volstruisfontein, of what are probably parts of the same teapot-lid in spits 1, 3, 5 and 8 (Figure 4) is a strong indication that the shelters are not immune to processes of displacement. This is not unexpected.

Our conclusion thus confirms the absence (or extreme paucity) of backed pieces in the upper levels of shelter sequences in the adjacent middle Orange River valley, only 100 km away. There bone point fragments also continued into the uppermost levels.

If microliths were barbs in wooden arrow points, then they were perhaps rapidly replaced in early historic times by the triangular iron tips reported by travellers. The iron scrap would have been obtained from the first wave of Dutch trekboers. The change took place in the period AD 1770-1800. Unfortunately the small iron sheet fragments mentioned in spit 2 at Haaskraal is so rusted that it cannot be identified as a triangular arrowhead. This applies also to another fragment in spit 7 (Fig. 5), and to tiny rust scales recovered from the front of Boundary in spit 8 (Fig. 11) Whether these apparently very early traces of iron are of European or native origin (*e.g.* Sampson 1972: fig. 78) has not been determined.

The evidence remains good that backed microliths were being made until AD 1770-1800. The South African interior must, therefore, be one of the last places on earth where backed microlith technology was routinely practised by a native population. Several archaeological sites have yielded backed microliths from apparently nineteenth century strata. However, contextual analysis and consideration of post-depositional factors strongly indicate that, even if occasional backed microliths were made during the historic period, this was no longer routine.

ACKNOWLEDGEMENTS

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ARCHAEOLOGICAL COLLECTIONS FROM THE ANGLO-ZULU WAR IN THE COLLECTIONS OF THE BRITISH MUSEUM

PETER J. MITCHELL

Pitt Rivers Museum, University of Oxford,
64, Banbury Road, Oxford 0X2 6PN,
United Kingdom

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ABSTRACT

Following the Anglo-Zulu War of 1879, Stone Age artefacts were collected by officers in the British Army from several localities in KwaZulu-Natal and later acquired by the British Museum. These collections are described and their significance for what they can reveal about the history of antiquarian collecting in nineteenth century southern Africa is discussed. They form part of a wider pattern in which much nineteenth century archaeological activity in the sub-continent was conducted by professional individuals with a wide range of intellectual interests, who were often linked by a range of personal ties and who took an active part in the growth of palaeolithic archaeology in Britain itself.

INTRODUCTION

The Anglo-Zulu War of 1879 was one of the defining political events of nineteenth century South African history. It resulted in the conquest, and eventual annexation, by Britain of the largest and most powerful independent African state south of the Limpopo (Morris 1965). The archaeological record of this conflict has recently been considered by Webley (1993), who has excavated the remains of the mission station at Rorke's Drift and of Fort Bromhead, which was built on the site immediately after the battle fought there on January 22nd 1879. In the course of these excavations Middle Stone Age artifacts were found in basal gravels beneath the historic period material (Webley 1992:32). As part of a study of the British Museum's collections of Stone Age artefacts from southern Africa (Mitchell in press), several artefact assemblages have been identified that were collected by officers of the British Army immediately before and after the War. These artefacts come not only from Rorke's Drift, but also from Buffalo River, Escourt, Isandhlwana, Newcastle and Pietermaritzburg, as well as elsewhere in KwaZulu-Natal (Fig. 1). This paper describes these artefacts and places them within the broader context of nineteenth century antiquarian activity in South Africa.

THE COLLECTORS

Three individuals were involved in acquiring Stone Age collections from KwaZulu-Natal around the time of the Anglo-Zulu War. The most significant, in terms of the range of sites from which he collected, was Colonel Henry W. Feilden (1838-1921), who was stationed in KwaZulu-Natal during the First Boer Anglo War of 1881. Feilden had what can only be described as a varied military career that also took him to India (the Indian Mutiny of 1857-1858), China (the Second Opium War, 1860) and North America, where he fought on the Confederate side (1862-1865). Most of his collections from South Africa were made in 1881 (Feilden 1883), but when sent back to South Africa during the Second Anglo Boer War he took advantage of his posting in Cape Town to collect further artefacts from the Cape Flats and the area around Stellenbosch. He subsequently travelled in both the Northern Cape and Zimbabwe, collecting more artefacts in the gravels of the Zambezi River above and below Victoria Falls (Feilden 1905).

The breadth of his interests are indicated by the fact that he served as a naturalist on the British Polar Expedition of 1875-1876 and also travelled widely in the Arctic (Revere 1988). Indeed, while in KwaZulu-Natal he also wrote to the Director of the Royal Botanic Gardens at Kew asking if he would be interested in acquiring a collection of lichens from the slopes of the Drakensberg Mountains (Royal Botanic Gardens, Kew, Director's Correspondence, South Africa. Vol. 189 No. 561).

Feilden (1883:171) was one of several antiquarians of the 1870s and 1880s to record that Bushmen used the glass of abandoned soda water bottles to make arrowheads (*cf.* Bowker 1872; Frere 1881). Interestingly, he also foreshadowed the recent suggestion that quartz crystals found in Stone Age deposits may have formed part of shamanistic paraphernalia (Wadley 1987) by

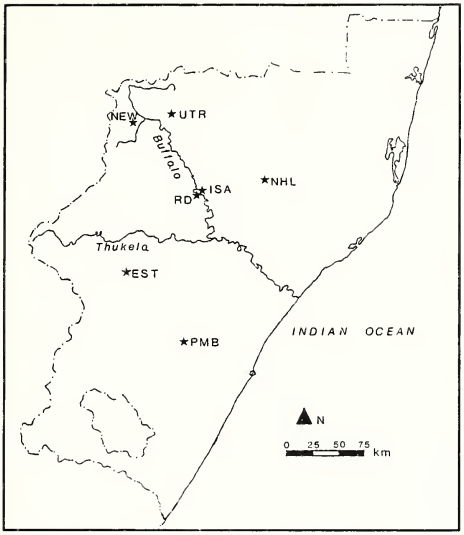

Fig. 1. KwaZulu-Natal showing sites mentioned in the text. EST Estcourt; ISA Isandhlwana; NEW Newcastle; NHL Nhlazatshe; PMB Pietermaritzburg; RD Rorke's Drift; UTR Utrecht.

suggesting that 'stone-age people had carried these crystals either as charms or ornaments' (Feilden 1883-169) and by citing their use on a Zulu 'necklace of charms' in support of his argument.

Colonel J.H. Bowker (1822-1900) also took advantage of his presence in Zululand to collect artefacts that he subsequently donated to the British Museum. James Bowker shared with his brother Thomas a broad range of scientific interests, including Stone Age archaeology, and like him was both an officer in the military forces of the Cape Colony and a colonial administrator. Having held various appointments, he was, for example, made High Commissioner for Basutoland on its annexation to the Cape Colony in 1868 (Hockly 1966). A keen botanist and entomologist, J H Bowker donated and sold specimens of plants to the Royal Botanic Gardens at Kew from at least as early as 1853. It was to the Director of the Gardens, Sir Joseph Hooker, that he sent artefacts from his excavations in rock shelters in western Lesotho (Royal Botanic Gardens, Kew, Director's Correspondence, South Africa Vol. 189, No. 388: letter dated May 20th, 1867; Gooch 1881:153). While there he also reported that the Maluti San were still using stone arrowheads (Bowker 1872), while Gooch (1881) records that he collected Stone Age artefacts in the Maputo and Inhambane areas of Mozambique and the East London area of the Eastern Cape Province.

The third individual discussed was ultimately responsible for the presence of both Fielden and Bowker in KwaZulu-Natal since, as British High Commissioner in South Africa, it was Sir Bartle Frere (1815-1884) who took the decision to invade Zululand at the beginning of 1879. A grandson of John Frere, one of the first people to recognise the true importance of associations between stone artefacts and the bones of extinct animal species (Daniel 1975), Frere entered the Indian Civil Service in 1834, becoming Governor of Bombay between 1862 and 1867 (Dictionary of National Biography, first edition, pp. 697-706). He first entered the African political scene when sent to Zanzibar in 1873; Frere was appointed Governor of the Cape Colony and British High Commissioner in South Africa in 1877, charged by the Colonial Office with the task of uniting the British colonies and the independent Boer republics within a British controlled federation. Partly to acquire Boer support for this idea, he provoked the Anglo-Zulu War in 1879. In large part because of the disasters suffered by the British forces at the outset of the War, Frere was recalled to London in 1880. He had wide-ranging anthropological and archaeological interests (Frere 1881) and before moving to South Africa held the Presidency of the Asiatic Society in 1872 and that of the Geographical Society in 1873. Many of his collections were donated to the British Museum by his son in 1910. Most are ethnographic specimens and are held in the British Museum's Department of Ethnography, but an Early Stone Age handaxe provenanced to the 'Kalahari' is also present in the collection. His daughter subsequently donated several further Stone Age artefacts collected by her mother around 1880 from the 'Kalahari' and the Eastern Cape Province (Mitchell in press).

THE FEILDEN COLLECTION

Feilden exhibited the artefacts that he collected from what is now KwaZulu-Natal, as well as a few others from the Rustenburg area of the North West Province, to a meeting of the Anthropological Institute of Great Britain and Ireland on May 22nd 1883 (Feilden 1883). The Rustenburg specimens appear to have been the first lithic artefacts published from the former Transvaal. Some of the artefacts displayed at this meeting were then donated to the British Museum on October 5th 1883, the majority being acquired for the Museum's Christy Collection, which had originally been created by the banker and antiquarian Henry Christy (J. Cook, pers. comm.). The remainder of the Feilden artefacts in the British Museum form part of the Sturge Collection. W.A. Sturge collected and purchased over 100 000 artefacts during his lifetime, bequeathing much of his collection to the British Museum in 1919. Other artefacts collected by Feilden in KwaZulu-Natal now form part of the collections of other museums in the United Kingdom. Artefacts from Estcourt form part of the collection of the Liverpool Museum and the Pitt Rivers Museum, Oxford. Artefacts provenanced merely to 'Natal' form part of the collections of Oxford University's Ashmolean and Pitt Rivers Museums, as well as those of the Liverpool Museum and The Natural History Museum. However, by far the largest number of artefacts collected by Feilden in South Africa were donated to Norwich Museum, from which

they were transferred to Liverpool Museum, and to Cambridge University's Museum of Archaeology and Anthropology (Mitchell in press).

1. Buffalo River

Christy Collection, ex Feilden, +7841

This single hornfels scraper forms part of a much larger collection from the valley of the Buffalo River, then the border between Zululand and the British colony of Natal, that are provenanced simply to 'Natal' (see below). It is culturally undiagnostic and in a slightly rolled physical condition.

2. Estcourt

Christy Collection, ex Feilden, +7843 - +7846

Estcourt was an important British military base in the middle of what is now KwaZulu-Natal in the mid-nineteenth century and these four unmodified hornfels Middle Stone Age (MSA) artefacts were collected there in February 1881. Feilden (1884:268) locates them specifically to a point about 200 m below a bridge on the right bank of the Bushmans River. Two are flakes and two flake-blades. One of the flakes has a faceted platform and the other is much more heavily patinated than the other artefacts.

3. Isandhlwana

Christy Collection, ex Feilden, +7836 - +7837

Isandhlwana, the first major battle of the Anglo-Zulu War of 1879, was one of the worst British military disasters of the nineteenth century; over 1300 troops were killed (Morris 1965). British forces remained in the area after the conclusion of the War and Feilden collected four artefacts here in July and August 1881 from near the centre of the former British camp. (Feilden 1883:168). In a letter to Mr Reeve of the Norwich Museum he commented on what he termed "the curious conjunction of Palaeoliths with fragments of modern arms of precision, broken assegais and skeletons of Kafirs (*sic*)!"

Two of the artefacts that Feilden collected at Isandhlwana, both of them made in hornfels, form part of the British Museum collection (Fig. 2). Both are unmodified, heavily patinated and in a rolled condition. The flake has a faceted platform and the flake-blade has lost both its tip and its butt. The artefacts are provenanced in the British Museum's Christy Collection Slip Catalogue to 'Isandulana', an older spelling of Isandhlwana. Both are of MSA origin.

4. Natal, between Newcastle and Rorke's Drift

Christy Collection, ex Feilden, +7847 - +7859 - +7866

Feilden's (1883) account of the material that he collected in South Africa in the aftermath of the Anglo-Zulu War strongly suggests that all the artefacts in his collection in the British Museum that are provenanced merely to 'Natal' come from along his line of march

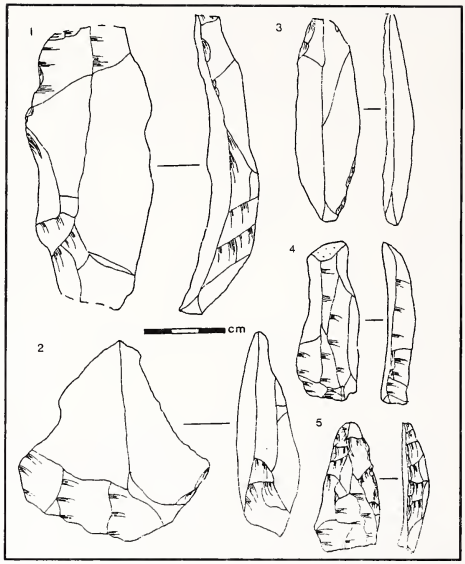

Fig. 2. Middle Stone Age artefacts in the Christy Collection, *ex* Feilden, from Isandhlwana and Natal, No Further Provenance. 1-2 Isandhlwana: 1 unmodified flake-blade, 2 unmodified flake; 3-5 Natal, No Further Provenance: 3-4 unmodified flake-blades; 5 bilaterally retouched point. All artefacts are made in hornfels.

between Newcastle and Rorke's Drift. Indeed, he states that he "took advantage of every opportunity that arose for leaving the line of march and examining the 'dongas' and denuded surfaces that lay contiguous to this route" (Feilden 1883:165). Some of the artefacts (Fig. 2) form part of the Christy Collection of the British Museum, while others form part of the Sturge Collection.

Seven of the 76 artefacts in the Christy Collection are marked with one of two dates (8.viii.81 and 18.vi.81), presumably the dates on which Feilden collected them. The presence of several flake-blades and the large number of retouched points and knives suggests that the group as a whole is almost entirely of MSA origin (Table 1). However, the opaline scraper, as well as one of those in hornfels which has adze-like lateral retouch, are both of Later Stone Age (LSA) origin. The other artefacts display considerable variation in their physical condition, form fresh to quite rolled, suggesting they are not all of the same age and/or have had the same depositional history.

Sturge Collection, ex Feilden, unnumbered

This group of 26 artefacts and 18 unworked pieces of stone was found stored with the Christy Collection, *ex* Feilden, from Natal. No Further Provenance. Most of the artefacts are of MSA origin. These two features suggest that they have a similar origin and this possibility is strengthened by the fact that the same system of dating

Table 1. The Christy Collection, *ex* Feilden, from Natal, No Further Provenance.

	Hornfels	Sandstone	Opaline	Quartz	Tuff	Dolerite	Quartzite	Siltstone/mudstone	Total
Irregular-cores	1	-	1	-	-	-	-	-	2
Flakes	13	4	2	2	-	-	1	-	22
Flake-blades	5	-	-	1	-	-	-	-	6
Proximal sections (of flake-blades)	1	-	-	-	-	-	-	-	1
Utilised flakes	-	-	-	-	1	-	-	-	1
Scrapers	4	-	1	-	-	-	-	-	5
Knives - unilateral	11	1	-	-	1	-	-	-	13
Points	16	3	-	1	1	-	-	1	22
Unifacial points	2	-	-	-	-	-	-	-	2
Total	53	8	4	4	3	1	1	1	76

Table 2. The Sturge Collection, *ex* Feilden, No Further Provenance.

	Hornfels	Sandstone	Opaline	Quartz	Quartzite	Total
Core-reduced pieces	1	-	-	-	-	1
Flakes	9	1	1	1	1	13
Flake-blades	3	-	-	-	-	3
Scrapers	-	-	1	-	-	1
Knives - unilateral	2	-	-	-	-	2
Points	1	1	-	-	-	2
Total	16	2	2	1	1	22

has been used to mark some of these artefacts as was employed by the Feilden artefacts in the Christy Collection. However, the bulk of the artefacts are unmarked.

The four dated artefacts are all made in hornfels and comprise an unmodified flake (marked 1.v.81), a further unmodified flake and an unmodified flake-blade (both marked 18.vi.81) and a retouched point (marked 8.viii. 81). The totally unmarked artefacts (Table 2) show great variation in their physical condition from fresh to quite rolled and the hornfels artefacts are variably patinated (from not at all to quite thickly). Both these features suggest that the artefacts have a varied age and/or depositional history. The single scraper, however, has adze-like lateral retouch and is thus almost certainly a LSA piece (Deacon 1984).

5. Newcastle

Christy Collection, ex Feilden, +7842.

Feilden (1883:163-164) records that the bulk of his collections were made while he was quartered in the Newcastle area of what is now north western KwaZulu-Natal. He exhibited five of these artefacts (described as 'two spear-heads, two arrow-heads' and what was obviously a bored stone) to the Royal Anthropological Institute, but only one is present in the collections of the British Museum. It is an unmodified MSA flake with a faceted platform and is made in dolerite.

6. Pietermaritzburg

Sturge Collection, ex Feilden, unnumbered

Pietermaritzburg was known as a source of stone artefacts from at least the time of the first publication on the archaeology of KwaZulu-Natal (Sanderson 1878). Feilden (1883:169) collected from several localities and records finding artefacts close to or on the surface to the south, east and west of the city, as well as in the gravels of the Msunduze River. The Feilden artefacts from Pietermaritzburg consist of four unmodified flakes, three of which are dated 1882, 26.3.1882 and 1.4.1882, presumably the dates on which they were collected. Three are made in hornfels and one in siltstone/ mudstone. The latter, as well as one of the two patinated hornfels flakes, have faceted platforms, which suggests that the collection is of MSA origin.

7. Zululand, between Utrecht and 'Inlazatche mountain'

Christy Collection, ex Feilden, ex Curtis and Pennefather, +7838 - +7840

Feilden (1883: 168) records that two of his military

colleagues, Colonel Curtis and Captain Pennefather of the Inniskilling Dragoons, gathered a total of 12 artefacts along the line of their march from near Utrecht to 'Inlazatche mountain'. This is almost certainly modern Nhlazatshe, which lies to the northwest of Ulundi and only a few kilometres north of the White Mfolozi River. At the time of Curtis and Pennefather's march Nhlazatshe was the headquarters of Melmoth Osborn, the second British Resident in Zululand (Laband 1997). Pennefather himself remained in Zululand until at least 1888, taking part in further military operations there at that time with the Inniskilling Dragoons (Laband 1997).

Ten of the artefacts mentioned by Feilden (1883) form part of the British Museum collections. Two- a sandstone flake and a hornfels point - are marked 'Sept. 1881 H.W. F.', which may be the date on which they were collected by, or given to, Feilden. The formal tools and the faceting of the platform on the quartz flake suggest that the entire collection is of MSA origin. It consists of four unmodified flakes (one each in hornfels, vein quartz, opaline and sandstone), one crested blade (*lame á crête*) made in sandstone, one unmodified hornfels flake-blade, one hornfels retouched point and one hornfels unilaterally retouched knife.

THE BOWKER COLLECTION

1. Rorke's Drift

Christy Collection, ex Bowker, +7539 - +7570, +7572 - +7580

Col. J H Bowker was a member of the expedition to the site of the Prince Imperial's death. In an account published in the *Natal Witness* on April 17th, 1880 he refers to the presence of prehistoric artefacts "in the dongas and hollows near Rorke's Drift and Isandhlwana", some of which were found while excavating the foundations of the Queen's Cross Memorial (Gooch 1881:175). It is some of these artefacts (Fig. 3) that he sent to Sir Joseph Hooker, who donated them to the British Museum in August 1880 (Royal Botanic Gardens, Kew, Director's Correspondence, South Africa Vol. 189 Nos. 400-412; Christy Collection Slip Catalogue, British Museum). Bowker commented in his *Natal Witness* article that the artefacts he had found at Rorke's Drift and Isandhlwana "differ but little from those I have found in Cape, Griqualand West, Free State etc. No polished ones were found, all of the ordinary type and some carefully chipped from agate, spar, sandstone and fossil wood. The usual core and flakes struck off, together with old pointless weapons were met with, in greater numbers than the perfect weapons, which vary in size..." This is, as far as it goes, a not wholly inaccurate description of the artefacts present in the British Museum collection.

Of the 42 artefacts present in the Christy, *ex* Bowker, Collection in the British Museum, a rolled dolerite handaxe is clearly of Early Stone Age origin, while a single spokeshave in much fresher condition than any of the other hornfels artefacts probably belongs to a Later Stone Age industry of the second half of the Holocene.

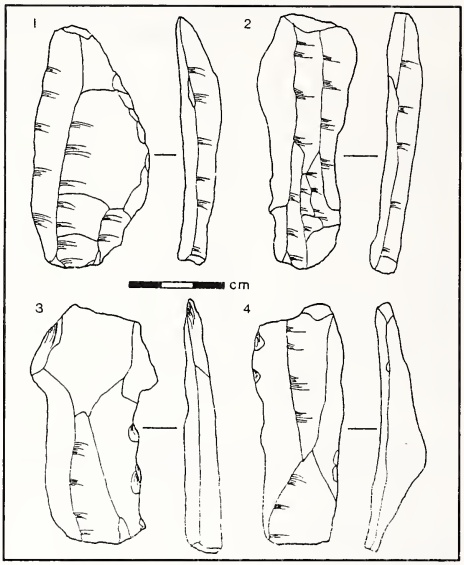

Fig. 3. Middle Stone Age artefacts in the Christy Collection, *ex* Bowker, from Rorke's Drift. 1-4 unmodified flake-blades, all in hornfels.

The rest of the collection is of MSA origin, as is indicated by both the flake-blades and the formal tools present. The hornfels artefacts are variably patinated and rolled, which may indicate that not all of them have had the same depositional history and/or that they are not all of the same age. One of the quartz flakes and the opaline flake are also both in fresh condition and may thus be more recent than the remaining artefacts listed in Table 3.

THE FRERE COLLECTION

1. Kaffirland (*sic*), No Further Provenance.

Frere Collection, 1910.10-5.89-90

The word 'Kaffir' (for most of the twentieth century a racist term of abuse for Black South Africans) was employed in the nineteenth century principally to refer to the IsiXhosa-speaking communities of the Eastern Cape, although it was also used more widely with reference to other Nguni-speaking peoples, including the Zulu. Since the two artefacts discussed here were donated as part of Sir Bartle Frere's much larger ethnographic collection from Zululand, it seems likely that they were also obtained from there, presumably from north of the Thukela River, which formed the then boundary between the British colony of Natal and the Zulu kingdom. The date of November 20th 1878 on one of the artefacts supports this hypothesis for their origin as Frere had been in Natal for some two months by this time (Laband 1997).

Table 3. The Christy Collection, *ex* J.H. Bowker, from Rorke's Drift.

	Hornfels	Quartz	Sandstone	Opaline	Total
Irregular cores	2	-	-	-	2
Flakes	9	2	2	1	14
Flake-blades	6	-	1	-	7
Proximal sections (flake-blades)	3	-	-	-	3
Mesial sections (flake-blades)	1	1	-	-	2
Distal sections (flake-blades)	1	-	-	-	1
Utilised flake-blades	1	-	-	-	1
Scrapers	1	-	-	-	1
Knives - unilateral	1	-	-	-	1
Knives - bilateral	1	-	-	-	1
Points	4	-	1	-	5
Bifacial points	2	-	-	-	2
Total	32	3	4	1	40

The collection comprises two Middle Stone Age hornfels unmodified artefacts, one a flake, the other a flake-blade. The flake has a now partially illegible label on its ventral surface, on which only the date 20.11.78 can still be read. This may be the date on which the artefact was found or acquired by Sir Bartle, less than two months before the commencement of the British invasion of Zululand, which he had orchestrated, in January 1879.

DISCUSSION

All together 168 stone artefacts in the British Museum collections were acquired before and immediately after the Anglo-Zulu War of 1879. This represents almost one-third of the total number of artefacts from KwaZulu-Natal in the British Museum's Department of Prehistoric and Romano-British Antiquities and ten out of a total of 18 individual collections from this province (Mitchell in press). They thus form a significant component of the British Museum Stone Age collections from South Africa, although their small number and the fact that one come from primary, stratified contexts obviously renders them of limited value to the modern researcher. Where they are of importance, however, is in what they and the manner of their discovery and publication reveal about the history of nineteenth century antiquarian activity in southern Africa.

Both Feilden and Bowker were in KwaZulu-Natal in 1880-81 because they were officers in the British Army. The same was true, in a sense of Frere two years before, as that army's local commander-in-chief. That all three took time out from their official duties to pursue an interest in archaeology is impressive, but not, in fact, as remarkable as it might first seem. Analysis of the background of the collectors represented in the British Museum collections from southern Africa shows a repeated involvement by British military officers and colonial administrators in collecting stone artefacts, not only in the Anglo-Zulu War of 1879, but also in the First and Second Anglo-Boer Wars and the 1884 Bechuanaland Expedition, as well as when passing through the Cape Colony en route to or from Britain (Mitchell in press). In fact, very few of the artefacts collected from South Africa during the nineteenth century and donated to the British Museum can be said to have been collected by individuals professionally involved in the academic or museum worlds. Langham Dale (Dictionary of South African Biography 1:201-204) and Hugh Exton (Dictionary of South African Biography 3:282) are notable exceptions, but the overwhelming majority of these collections were, in the nineteenth century, the work of men who, while interested in archaeology, also encountered Stone Age artefacts in the course of their professional work as geologists, engineers, surveyors, soldiers *etc.* (Mitchell in press).

That Feilden, in particular, felt it important to bring the results of his collecting in South Africa to the attention of archaeologists and anthropologists in Britain is also part of a much wider pattern. From the very beginning of archaeological activity in South Africa in the 1850s, South African-based antiquarians were at pains to communicate their research to an international public. Given that both the Cape of Good Hope and Natal were British colonies and that many collectors were either British or of British origin, they sought to do so by sending papers, often accompanied by the artefacts those papers described, to colleagues in Britain. The Anthropological Institute of Great Britain and Ireland and its predecessors was a favoured place for their exhibition and many of the artefacts discussed at its meetings were subsequently acquired through donation or purchase by the British Museum. Feilden (1883:163) was himself very aware of this and notes the publication in the institute's journal of two early synthetic papers, those of Sanderson (1878) on the archaeology of Natal and of Gooch (1881) on the Stone Age of South Africa as a whole. Frere (1881) too used the journal to publish a paper on the

relations between white settlers and native Africans in South Africa. The comments of both the authors and the discussants of such papers show a keen desire to relate new finds from South Africa with the picture then beginning to emerge in European palaeolithic archaeology (*e.g.* Gooch 1881; Feilden 1883:173-174). Indeed, this continued a trend initiated in the late 1860s when a series of papers by Sir John Lubbock (1869, 1870a, 1870b, 1871) mentioning artefacts collected by Langham Dale and C.J. Busk on the Cape Flats were used as 'ammunition' (Goodwin 1935: 295) in his struggle with Thomas Huxley for a dominant position in the newly forming Anthropological Institute. Elected its first President in 1871, it was partly under Lubbock's patronage that southern African artefacts continued to be exhibited at the institute through the rest of the nineteenth century, though they also reached a wider audience when put on show in such contexts as the Colonial Exhibition of 1886 (Hamy 1899).

Contacts such as these with developments in Europe, as well as the growth of archaeology within South Africa itself, were helped by the personal relationships between many of the key players in both continents. This is particularly evident in the case of J.H. Bowker and his relatives. Bowker's correspondence with Sir Joseph Hooker, Director of the Royal Botanic Gardens and at one time President of the Royal Society, was with an individual centrally located within the mid-nineteenth century British scientific elite and, moreover, someone who was a personal friend of figures such as Sir Charles Lyell and Charles Darwin. Lyell himself donated to the British Museum artefacts collected at Grahamstown by Andrew Geddes Bain (Mitchell in press) and appears to have asked other contacts in South Africa, among them Mrs Frances Colenso, wife of the Bishop of Natal, to collect further artefacts (Rees 1958:103). James Bowker's brother, Thomas, stayed with the Colensos before the outbreak of the Anglo-Zulu War, while both Bowkers were related by marriage to Dr (W.G.?) Atherstone, another contributor to the British Museum's collections from the Eastern Cape Province and first President of the South African Association for the Advancement of Science (Hockly 1966). James Bowker's entomological interests were shared with Daniel Kannemeyer (1890), another leading figure in the development of archaeology in the Eastern Cape, and the two may have served together in the Cape Mounted Rifles' campaign against Chief Moorosi in Lesotho in 1879. Though not exhaustive of the personal and family connections of the Bowker brothers, this does give some idea of the nexus of scientifically interested individuals of which they formed an important part.

CONCLUSION

Although less than 200 in number the artefacts described here exemplify several important trends in the early history of archaeology in South Africa. Collected during and immediately after the Anglo-Zulu War of 1879, they point to the importance of such large scale political events in spurring on the collection of Stone Age artefacts. That the collections on which I have focused in this paper were the work of individuals serving in the British military or colonial government exemplifies a more general pattern in the history of not only the British Museum collections from southern Africa, but also those in other British museums (Mitchell in press). Feilden's (1883) presentation of his finds to a meeting of the Royal Anthropological Institute is also typical of other South African-based collectors in the second half of the nineteenth century, many of whom published reports of their activities in British-based journals. Both the initial collecting and later publication were facilitated by ties of friendship and professional contacts between the individuals concerned; Bowker's links to Lyell and Hooker, as well as to Atherstone, Kannemeyer and others, illustrate this point. The British Museum collections from the Anglo-Zulu War, as well as from other areas of southern Africa, therefore show that the collectors involved in their formation were part of wide-ranging intellectual networks, both within thee sub-continent and extending to the scientific elite of contemporary Britain. Right from its earliest days, southern African prehistory has never been peripheral to developments in the wider fields of palaeolithic and hunter-gatherer research.

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POPULATIONS, PREHISTORY, PENS AND POLITICS: SOME REFLECTIONS FROM NORTH OF THE ORANGE RIVER*

A.J.B. HUMPHREYS

Department of Anthropology and Sociology,
University of the Western Cape,
Private Bag X17, Bellville, 7535

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ABSTRACT

During the last several years there has been a substantial effort to reclaim and rehabilitate 'indigenous identities' in South Africa. The past has been a significant resource in the shaping and authentication of some of these identities. As many of these identities claim to extend back to before the colonial era and the related establishment of a written record, archaeology has a potential role to play in this new identity construction process. The purpose of this paper is to examine the historical background to some of the identities being asserted in the Northern Cape as a case study in the assessment of the contribution that archaeology can make within this new scenario.

INTRODUCTION

A challenging and important aspect of the 'new South Africa' is the way in which historically derived indigenous identities are being claimed and asserted. Among these identities are many which had hitherto been neglected if not actually denied. The need to construct an identity is a fundamental and very human characteristic. Individuals and groups need to make statements about their relationships to particular situations. In order to do this they appropriate certain resources and manipulate them to make explicit (or implicit) statements about who or what they are in those situations. The resources that are marshalled may be non-material (like beliefs or ideologies) or material (like certain styles of dress or the carrying of objects such as 'traditional weapons'). However, as Klinghardt (1997) has recently observed, some "forms of cultural identity [are] based on idealised images of the past that seem to owe more to trends in Western scholarship than to documentary evidence." The purpose of this paper is to examine the role of three related concepts used by Klinghardt - 'idealised images of the past', 'Western scholarship' and 'documentary evidence' - in contemporary identity construction and to offer some thoughts on their implications for archaeological research. Specific reference will be made to the Northern Cape so as to keep the discussion within manageable limits but, as will become clear, the issues addressed here are of far wider significance.

"THE HISTORY" OF THE NORTHERN CAPE

All histories of the Northern Cape along the Orange River and beyond assume the prior existence of a variety of groups or identities. This is evident in all syntheses both before and since 1969 with its two seminal works, the "Oxford History" (Wilson & Thompson 1969) and Martin Legassick's (1969a) PhD thesis entitled - significantly - "The Griqua, the Sotho-Tswana and the Missionaries." An example of a recent manifestation of this assumption is Nigel Penn's chapter on the Orange 1770-1805 in "Einiqualand" (Smith 1995) where the first few pages refer to discrete groups of Khoi, San, Korana and "groups of Sotho-Tswana". The distinct impression is created that these various groups 'enter' the historical record as it reaches them as the colonial frontier pushes inexorably northwards. Indeed, Parsons (1995) is very explicit about this where he suggests that it should be possible "... to push back the frontiers of history - the continuous story of identifiable people - into the misty realms of prehistory".

In terms of this approach the 'early history' of the Northern Cape can briefly (and selectively) be outlined as follows (see Fig. 1.). By as early as 1661 in the Journal of Jan van Riebeeck there was reference to a group known as the Brijckje (Briqua) probably located around the present day Upington (Saunders 1966). More extensive information on these people was forthcoming when Hendrik Wikar and Robert Gordon explored the area in 1778-9. Later explorers, most notably the Truter and Somerville expedition to Dithakong in 1801 (Bradlow & Bradlow 1979), met with the Tlhaping who came to be regarded as being the same people as the Briqua (Maingard 1933). These and other groups were in turn part of a larger grouping known as the Bechuana, Tswana and other variations derived from a name "Moetjooaanas" marked on a map drawn by Robert Gordon in 1779 (Legassick 1969b). There were, of

course, many other groups in the area but these few can be used to illustrate the point to be made in this paper.

It will be argued here that these and other names are the creations of specific historical circumstances, that they do not extend back into 'prehistory' (contrary to Parsons' (1995) optimism) and that they are consequently of no 'primordial' significance whatsoever. But, having said that, it must be recognised that they can be, and indeed are, highly contested identities today. It is precisely here that the dilemma exists for the archaeologist; how do we address the past if it is actually devoid of groups alleged to have peopled it?

THE ROLE OF LITERACY: A MODEL

The interpretation being suggested here draws on the work of Jack Goody (1977) and highlights the intervention of writing or literacy with the resultant establishment of what will here be termed the 'literary lattice'. To understand the significance of this intervention it is necessary to emphasise that identity is always negotiated. This means that identities are moulded in response to the situation in which the person or group finds themselves. In pre-literate societies this sort of negotiation is very fluid and tends to be bound to occasion or context. But as contexts change because of factors such as famine, invasion, disease and so on, then ideas and practices themselves will change resulting in other identity configurations. As Goody (1977:43) observes, "They seem more likely to do so here [in pre-literate societies] than in societies where ideas, religious or scientific, are written down in scholarly treatises or in Holy Writ". This is because when the written record intervenes it has the effect of 'freezing' situations and rendering them timeless. "Why?" asks Goody (1977:44), "Because when an utterance is put in writing it can be inspected in much greater detail, in its parts as well as in its whole, backwards as well as forwards, out of context as well as in its setting... Speech is no longer tied to an 'occasion'; it becomes timeless. Nor is it attached to a person; on paper, it becomes more abstract, more depersonalised". The effect of this 'freezing' is compounded because as a classificatory device the literary lattice requires 'filling up' so it tends to produce or induce elements of identity which did not necessarily exist before. For example, if it requires 'leaders', leaders have to be created even if they did not exist before. But even more than this, as Goody (1977:54) notes, the organisation of knowledge into lists (or columns) and formulas (or rows) - hence the term 'literary lattice' - produces a "fixed two-dimensional character [which] may well simplify the reality of oral communication beyond reasonable recognition, and hence decrease rather than increase understanding". Over and above all of this, and very important in the present discussion, is the fact that the literary lattice provides an extra resource which people can manipulate in expressing their identity. Again, as Goody (1977:53) observes, we "move from considering how the use of literate procedures inhibits the study of pre-literate modes of thought, to examining the ways in which these procedures have influenced the cognitive structures and processes that have developed subsequent to the advent of writing".

"THE HISTORY" REVISITED

If this model is applied to the names mentioned above and shown on the map (Fig. 1) some interesting observations can be made regarding the intervention of the literary lattice and the subsequent "cognitive structures and processes".

The name Briqua (in various spelling forms - Saunders (1966) provides no less than 13) means 'the people of the goat'. This name appears to have been coined by the Khoekhoen for the people from whom they obtained goats (Saunders 1966). (It should be noted that the name 'Khoekhoen' is itself problematic but it can stand for present purposes). It may be suggested that this is unlikely to have been the name that the people used of themselves. It is, in all probably, an imposed identity related to specific exchange relations that existed at a specific period in time. Wilmsen (1989:98) goes so far as to assert that "Biriqua seems simply to have been a Khoikhoi equivalent of the Setswana Barwa categorization of peoples considered economically inferior". It is perhaps worth noting at this point that as early as 1801 Somerville observed of the 'Beriquas', "this name is considered to be a nickname given by the Coranna's who are their enemies, and is not recognised by them. They call themselves Boeshoeanna..." (quoted by Nienaber 1989:220). More will be noted about the Bechuana below.

The alleged later name - Tlhaping - is also a name apparently related to a set of specific temporary circumstances. Tlhaping means 'the people of the place of the fish' and is said to be derived from the fact that during a period of drought the people were forced to resort to eating fish (Maingard 1933). This was a food source not generally exploited in the region (Wilson & Thompson 1969:167) so the name is in some way 'derogatory'. The origin of the name of the neighbours of the Tlhaping, the Rolong, seems equally to have been bound to circumstances. Wilson and Thompson (1969:145) suggest that the name derives from a chief who was "called Morolong, *i.e.* blacksmith... This name...comes from an old word rola 'to forge'. His son Noto - that is, the hammer - also bore the name of the iron instrument which took the place of the primitive flint".

As already noted, the name Tswana is derived from the word "Moetjooaanas" inscribed on a map in 1779 by Robert Gordon (Legassick 1969b). From about 1830 the term 'Bechuana' came to be applied to all people in the interior of South Africa now generally called the 'Sotho-Tswana' (Legassick 1969b:96; Ambrose & Brutsch 1991: 161). Similarly, the name 'Sechuana' was used for the language of any of these people (Ambrose & Brutsch 1991:161). By 1887 the missionary John Mackenzie was able to remark: "These people [the Bechuana] do not use this word of themselves, or of one another; nevertheless

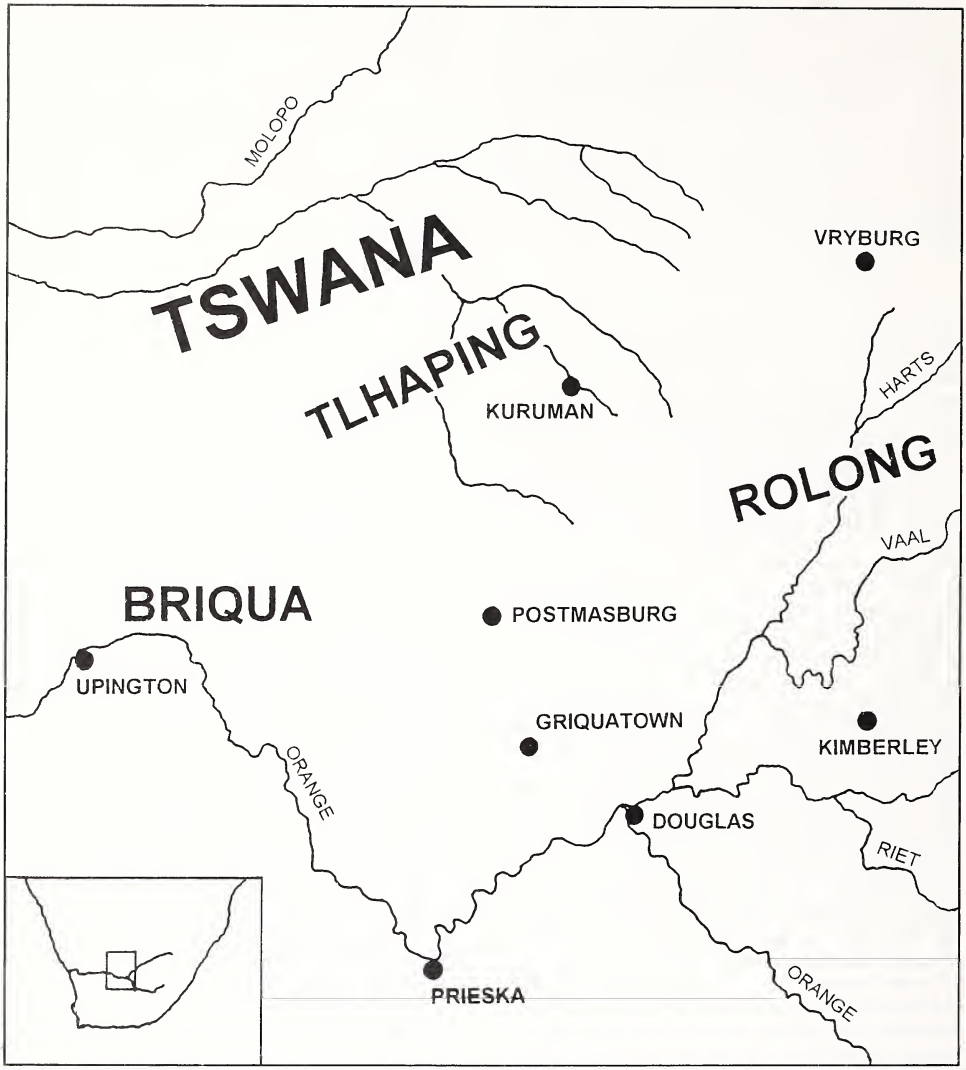

Fig. 1. Map showing the approximate locations of the groups mentioned in the text.

they accept of it as the white man's name for them, and now begin to use it of themselves" (quoted by Legassick 1969b:96), although, as noted above, Somerville records its use as early as 1801. Either way, it should be noted how the literary lattice is intervening - a recorded name is becoming a resource which is being appropriated and asserted by the people themselves in identity formation.

These last observations notwithstanding, the origin of the name Bechuana or Tswana (again with many spelling forms) is unknown and it has even been suggested by G.S Nienaber that it might be Khoekhoen inspired because of the '-n-a' ending (Nienaber 1989:225) (Consider here Kora and Korana or, indeed, the word San itself). Today the blanket use of Bechuana for the people of the interior has been replaced by 'Sotho-Tswana'. But the origin of the name Sotho is apparently equally 'contextual'. The first recorded use of the word 'Sotho' appears to have been in a letter by John Mellvill written from Griquatown in 1824 (Legassick 1969b:95). Mystery surrounds the origin of the word but

it has been suggested that it means 'black' and derives from the Usutu River in Swaziland, but whether 'black' refers to the river, people or to clothing is unclear (Legassick 1969b:95). Lye and Murray (1980:25) justify the use of Sotho because it "has the virtue of deriving from their own language "but this is hardly compelling as a reflection of indigenous identity. It is clearly yet another historically created name.

Even at a more macro level the integrity of a 'Tswana unit' can be questioned. In 1950 Isaac Schapera (1950: 140) in describing the 'tribes' of the then Bechuanaland Protectorate was able to observe, "For our present purpose it is enough to note that each of the tribes dealt with here has its own territory and forms a separate political unit under the leadership and authority of a chief who is subordinate only to the British Administration". Clearly the structure of the Tswana political unit was a creation of the literary lattice imposed by colonial bureaucracy. Tswana 'tribes' in South Africa were to suffer a similar fate being 'unified' within the fragmentary 'homeland' of Bophuthatswana.

Moving from names to languages themselves, some pertinent observations on the impact of the literary lattice can be made. Setlhaping was the first dialect to be written down (Ambrose & Brutsch 1991:180). By 1819 James Read had produced a spelling book which was printed in Griquatown and by 1826 Robert Moffat, Samuel Broadbent and James Archbell had all translated teaching materials (Lye & Murray 1980:67). These works became the bench mark for linguistic studies in the interior. Moffat's vocabularies were carefully studied by the pioneer French missionaries in Lesotho. Thomas Arbousset and Eugene Casalis who arrived in 1833, for example, systematically eliminated words when they were found not to have the same meaning in Sesotho or not to occur in Sesotho (Ambrose & Brutsch 1991:180). It can thus be seen clearly how language differences were constructed and formalised via the written word. As already pointed out, these languages came to be referred to as 'Sotho-Tswana' yet the linguist Ernst Westphal (1963:239) was able to assert, "There is no dialect which describes itself as Tswana and the grouping of the Western dialects as Tswana is not acceptable to the author". Whatever the current status of Westphal's views (and they surely are being contested), it is clear that literary lattice based manipulations are still at work.

Perhaps the most telling confirmation of the impact of the literary lattice from the very beginning is to be found in the words of King Moshoeshoe when he remarked to Arbousset in 1840: "My language is very beautiful. We are only beginning to realise this since we have seen it written down. Thanks to the little books of the missionaries, it will not be altered: there it is written; oh!, your paper; that paper organises everything well" (Ambrose & Brutsch 1991:101). The potency and impact of the literary lattice can be seen in an even wider context when note is taken of Gough's (1994) observation that, "A rather odd quirk of past divide and rule policies is that African languages in South Africa are far more institutionalised than in most sub-Saharan countries". The obsession with the meticulous documentation of the minutiae of 'cultural difference' within the apartheid paradigm is too well known to require reiteration here.

It is thus evident on the basis of the consideration of these and other examples that the literary lattice 'captured' certain names which were current at the time of its penetration and 'froze'them. Despite this, however, as pointed out above, one gains the impression from some historians (and, indeed, groups themselves) that these names represent identity conscious groups which had some sort of historical integrity which could be tracked back into the prehistoric or pre-literate past just as the manipulation of these identities can be documented during the subsequent historical period and even through to today. It has been shown here that, on the contrary, these names do not extend back in time and it is therefore contended that archaeologists should not pretend that they can study the 'prehistory' of any such groups. They must be recognised for what they are - the products of a combination of literacy and very specific sets of circumstances.

THE ROLE OF ARCHAEOLOGY

If such is the case, what is the role of archaeology? How do we address pre-literate identities which by definition fall outside of any Western (literary) scholarship or documentary evidence, to return to two of the concepts used by Klinghardt (1997) quoted at the outset.

Sahlins (1985:vii) has commented, "History is culturally ordered, differently so in different societies..." and herein lies a pointer. The literary lattice is but one way of ordering the past. It is one which is arguably most logical, and certainly most prevalent, in literate societies. Goody and Watt (1963:311) go so far as to suggest that, "The pastness of the past ... depends upon a historical sensibility which can hardly begin to operate without permanent written records ..." If this is so, it would seen futile to pretend that similar 'literary' style ordering is appropriate to pre-literate societies. Indeed, as Goody (1977:53) has pointed out, such a procedure inhibits the study of pre-literate modes of thought. Genealogies, to take but one example of a device valued in literary studies, cannot be used to 'push back history'. The function of genealogies in pre-literate societies was to legitimate the present order; they were and are not historical records in the conventional literary sense (Goody & Watt 1963:310; Van Warmelo 1974:57). Moreover, common people tended to order their lives according to genealogies - so much so, in fact, that it has been suggested that such people verged on 'historylessness' (Sahlins 1985:51). But such a position is clearly unsatisfactory. Nobody is without some sort of 'history' in the sense that things happened to and around them during the course of time. It is the form of understanding and articulation of that 'history' that might differ because such articulation is culturally ordered. It is largely with this non-literary 'cultural ordering' that archaeologists have to deal and it is herein that their greatest challenges and opportunities lie.

A major motivation for recourse to statements about

identity appears to be access to resources. This is certainly true today and, it may be suggested, would probably have been true of the past. If this premise is accepted, two main areas of thrust seem to suggest themselves. In the first place, archaeologists should be concerned with 'modes of production'. How did people survive? How did they engage with their environments, both physically and symbolically? Within what sorts of frameworks did people find it necessary to assert themselves and create identity, however elusive and fluid that identity might appear today? But, as Clark (1989:96) has pointed out, "A reductionist approach to archaeology is inadequate, even repellent, once it is remembered that archaeology is about people ... If they acquire their humanity by belonging to societies constituted by culture, it follows that archaeology must involve far more than researches into the means by which they managed to survive". This brings in the second thrust - 'modes of communication'. How was identity formed, expressed and played out? Again, as Clark (1989:96) points out, "it is one of the distinctive features of human as distinct from non-human societies that they attach importance to shaping objects as a way of proclaiming identity rather than merely as a means of manipulating the environment"

The literary lattice is only one way of defining meaning and proclaiming identity and we as archaeologists must not allow the literary lattice to straight-jacket our perceptions of the past or of the present or, indeed, of the future. Writing is very much an afterthought in the human saga. Other resources were also manipulated to make statements about identity and we need to find and understand them - particularly among material objects which are, after all, the 'stuff' of archaeology. One of the challenges facing archaeologists, then, is to make people aware of, and sensitive to, this long term view of identity construction.

CONCLUSION

As archaeologists strive to carve a niche for themselves in the late 1990s in South Africa, they need to be vigilant that they do not play into the politics of the day and produce what might ultimately be branded as "counterfeit history" (Clarke 1968:3) or "counterfeit sociology" (Longworth & Cherry 1986:15-16). Indeed, as David (1984) has observed, "Archaeology's primary role is not, after all, that of a purveyor of satisfying pasts and identities to ethnic, national and social groups ..." Perhaps ultimately we as archaeologists need to widen our vision and be even more far sighted for as Butzer (1982:320) has noted, "The past is essential to understand the present but even more important to evaluate the potential outcomes of modern trends. It is here that the contextual approach to the past forms a stimulating and provocative interface with the contemporary problems of regional development, resource management, sustained productivity, and ecological harmony ..." It is ... "more and more evident that former generations ... and ecological history can tell us as much about the viability of future strategies as can contemporary research". The future of the past might well lie not so much in looking back at resurrected past baggage but in looking forward to the potential for cooperation and mutual respect.

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METAL ARTEFACTS AND SLAGS FROM ARCHAEOLOGICAL SITES ON THE CONGO COAST*

DUNCAN MILLER

Department of Archaeology, University of Cape Town, Rondebosch 7701, Cape Town

email:dmiller@beattie.uctac.za

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ABSTRACT

Samples of slag and iron artefacts from six sites on the Congo coast ranging in age from 2310 ± 70 BP to 420 ± 50 BP were analysed. The sparse slag samples were fragments knocked off blooms and droplets produced during forging. The iron, containing typical two-phase inclusions, was produced in a bloomery. The production and fabrication technology did not appear to differ from that employed at Iron Age sites further south.

INTRODUCTION

This paper describes the analysis of archaeological metal artefacts recovered from sites on the Congo coast, collected during the 1990 and 1991 field seasons conducted by teams led by Prof James Denbow, University of Texas, United States of America. Twenty seven samples were submitted to the Archaeology Materials Laboratory at the University of Cape Town for examination and analysis.

The Early Iron Age material in particular was of interest because very little was known about the archaeology of the Congo coast until the beginning of this decade. The tropical west African coastal corridor possibly acted as a route for the introduction of the earliest phase of metal working in southern Africa (Denbow 1990). This makes the comparison of the fabrication technology used to produce the Congo material with that used to produce the earliest known material from Botswana further south (Miller 1996) potentially very interesting.

MATERIALS

Samples of metal artefacts and slag from six sites were submitted. Their descriptions were tabulated along with their label information (Table 1). With the exception of Champ de Tire (for which no date was provided with the samples) and Loubanzi (a Late Iron Age site with a radiocarbon date of 420 ± 50 BP), the sites were known to be Early Iron Age, with dates ranging from 2310 ± 70 BP to 1440 ± 100 BP (Denbow n.d.). The material consisted of very corroded fragments of iron, and small pieces of slag. One sample (Cong 15) consisted of organic remains and ceramic fragments and was not considered further.

ANALYTICAL METHODS

The samples were all described, weighed, drawn and photographed. Selected metal specimens were sampled with a rotary diamond saw. The samples were cold mounted in acrylic resin under vacuum to remove air bubbles. The mounted specimens were ground and polished on rotary laps, with a final ¼ micron diamond polish. All the sections were studied with a Reichert-Jung Polyvar dual metallographic/petrographic microscope using plane polarised light. The grain size and the carbon contents were established by visual comparison with standard charts (ASTM 1981).

RESULTS

Ore and slags

Two lumps of possible smelting ore (not illustrated) were included in the collection. These were lateritic ferrugenous cobbles containing numerous small rounded pebbles of quartz, cemented together with yellowish-brown hydrated iron oxides. It is possible that they may have represented ore material, but without the opportunity of comparing these nodules with locally available rock no firm conclusions could be drawn.

All the slag fragments were small, and none of the sites produced slag in sufficient sizes or quantities to suggest that smelting took place in proximity to the excavated areas. The Early Iron Age slags were irregular broken fragments that could have been knocked off raw blooms prior to forging. Two small rounded nodules of slag from the Late Iron Age site of Loubanzi (Fig. 1,

Table 1. Metal and slag specimens from the Congo coast, 1990 and 1991 field seasons.

NUMBER	LABEL	OBJECT	MATERIAL	MASS (g)
Cong 1	Kayes 1 0n-10w 40-50	nodule	slag, 3 pieces	30,94
Cong 2	Loubanzi 0/1e-10/11s 40-	plate	iron, 2 pieces	0,30
Cong 3	Loubanzi 0-20s 30-40	nodule	slag	1,18
Cong 4	Loubanzi 0-30s 10-20	nodule	slag, 2 pieces	1,80
Cong 5	Loubanzi 0-32s 30-40	bar	iron	1,71
Cong 6	B.P.113 19-20e 40-50	rod	iron	1,19
Cong 7	B.P.113 20w-19n 40-50	wire	ron, 7 pieces	3,37
Cong 8	B.P.113 19-20e 50-60	bar	iron	1,49
Cong 9	B.P.113 20w-19n 30-40	bar	iron, 2 pieces	1,15
Cong 10	B.P.113 20w-20n 40-50	pendant	iron, 8 pieces	6,48
Cong 11	B.P.113 21w-20n 40-50	plate	iron, 2 pieces	2,59
Cong 12	B.P.113 59-60w 10-20	wire	iron	0,14
Cong 13	B.P.113 78-79e 50-60	rod	iron, 2 pieces	1,46
Cong 14	B.P.113 79-80e 4s 70-80	spatula	iron, pieces	10,58
Cong 15	B.P.113 New site, Test #4, 80-	nodules	organics + ceramic	5,16
Cong 16	B.P.113 New site #4, Ext 3, 90-100	bar	iron	1,35
Cong 17	Mvindou 1 Bulldozer feature west 2-20	nodule	slag	0,55
Cong 18	Mvindou 1 Bulldozer feature west 40-60	nodule	slag	9,70
Cong 19	Mvindou 1 Bulldozer feature west 20-40	point	iron, fragments	0,82
Cong 20	Mvindou 1 5n-30w 20-30	arrowhead	iron, 2 pieces	0,96
Cong 21	Mvindou 1 25n-0e 10-70	spatula	iron	3,49
Cong 22	Mvindou 1 15n-0e 45-55	nodule	ore?, 2 pieces	399,09
Cong 23	Fignou 1 South Unit 1, 30-40	plate	iron	1,06
Cong 24	Fignou 1 Unit 2, 20-30	strip	iron	0,59
Cong 25	Fignou 1 SE4 20-30	nodule	iron	0,91
Cong 26	Fignou 1 Sondage 5, 20-30	nodule	slag, 2 pieces	15,68
Cong 27	Champ de Tire 1, B 0-20	plate	iron, 3 pieces	0,33

Cong 4) were similar in external appearance to droplets formed during smithing (*cf.* Miller & Whitelaw 1994). A more detailed analysis of so few fragments of slag from each of these sites did not appear to be warranted, due to the unlikelihood of recovering any technologically significant information from such sparse samples.

METALS

All the metal remains were ferrous, with no items made of copper. The Early Iron Age objects consisted of stout round and square wire or thin rods, fragments of iron sheets or plates, and small pieces of iron strip (see Figs 1-3). There were two fragmented spatulas and the remains of one barbed arrowhead, as well as a point. All the objects were very severely corroded and fragmentary, although one complete spatula or possibly small adze (Fig. 2, Cong 14) and an iron point (Fig. 3, Cong 19) could be reconstructed from their fragments.

Of the five metal fragments sampled for metallurgcial analysis, only the small bar fragment (Cong 5) from the most recent site of Loubanzi had any appreciable amount of metal left. This object (Fig. 1) consisted of relatively clean bloomery iron, forged into a small retangular bar, with a neatly squared-off end (Fig. 4). There were typical strings of transversely fractured two-phase inclusions, consisting of rounded droplets of the iron oxide wüstite surounded by dark glass (Fig. 5). In places these inclusions had been very thoroughly broken up and rounded (Fig. 6), which was indicative of heavy hot working of the metal. Etched with nital (2% nitric acid in ethanol solution), the metal was evidently very homogeneous, with a fine-grained normalised structure of pearlite islands in a ferrite matrix. The former austenite grain size was about ASTM 8 which indicated fairly rapid air cooling from a working temperature in excess of about 900 °C (Brick *et al.* 1965:234). The carbon content varied minimally from about 0,1% C (Fig. 7) to 0,2% C (Fig. 8), with no evident relationship between the carbon content and presence of inclusion bands. This was typical, well worked bloomery iron, which had been forged by a competent smith.

The Early Iron Age materials were all very corroded and consisted almost entirely of corrosion products (Figs 9-13) with very little residual iron, which was present as small isolated grains (Fig. 10). All the corroded samples contained residual strings of transversely fractured, devitrified, glassy and two-phase inclusions, typical of bloomery iron production. Despite the corrosion it was evident that these objects were the products of very competent smithing technique. The square wire fragment (Fig. 1, Cong 7) had a very symmetrical square cross-section (Fig. 9), and the eye of the pendant (Fig. 2, Cong 10) had been skillfully bent over and neatly abutted against the shaft (Fig. 11). The transverse section of the sample from the reconstructed spatula (or possible small adze) (Fig. 2, Cong 14) showed that the original object had been forged with a thin, symmetrically tapering

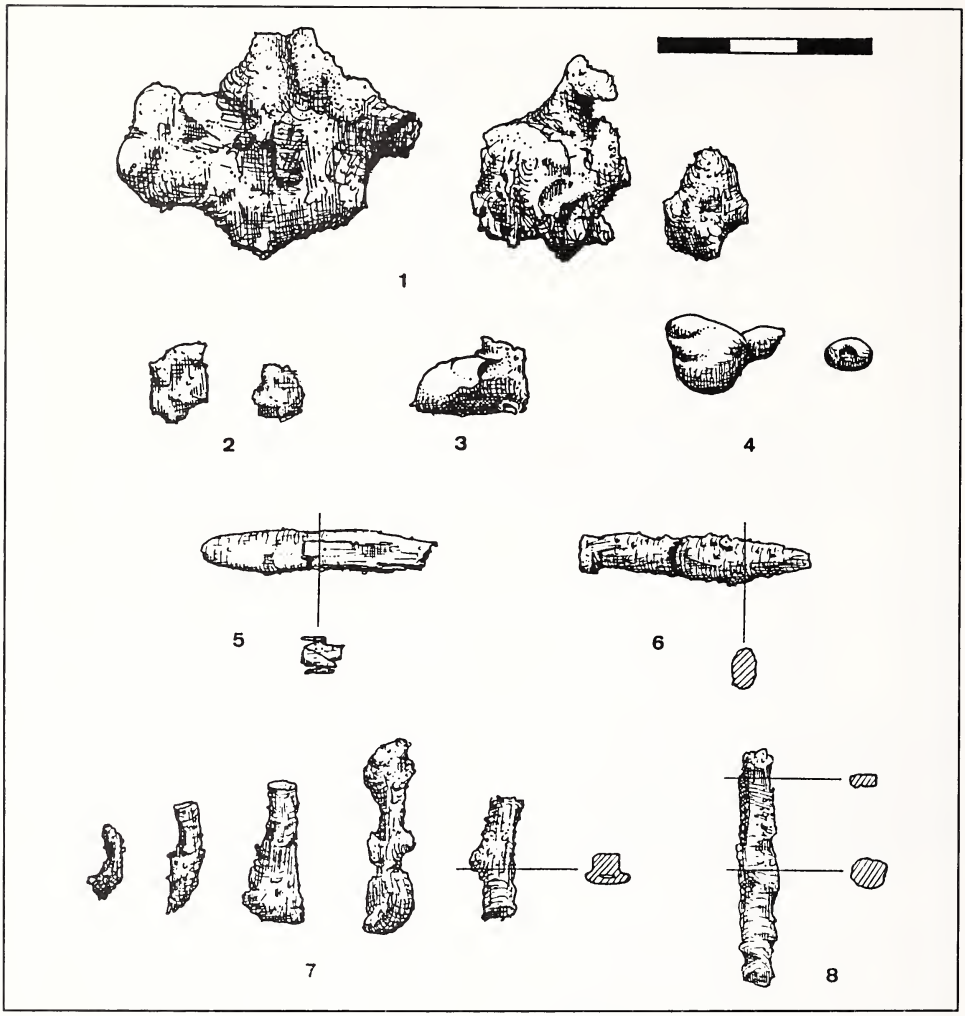

Fig. 1. 1, three slag nodules; 2, two iron plate fragments; 3, slag nodule; 4, two slag droplets; 5, iron bar; 6, iron rod; 7, iron wire fragments; 8 iron bar (scale in cm).

cross-sectional profile (Fig. 12). The sample of the second spatula fragment (Fig. 3, Cong 21) was too severely corroded for the original outline of the metal to be discerned (Fig. 13).

DISCUSSION

It is difficult to drawn any meaningful archaeological conclusions from such sparse collections, except for the obvious one that iron was worked in the vicinity of the archaeological excavations. The method of production was the bloomery, producing characteristic two-phase inclusion strings, and subsequent smithing was carried out in a competent fashion to produce symmetrical and well-shaped small artefacts. There was no sign of any deliberate heat treatment other than annealing and air cooling, which would have happened during normal smithing practice. There was also no sign of any appreciable difference between the Early Iron Age and more recent material, apart from the fact that the latter was less severely corroded.

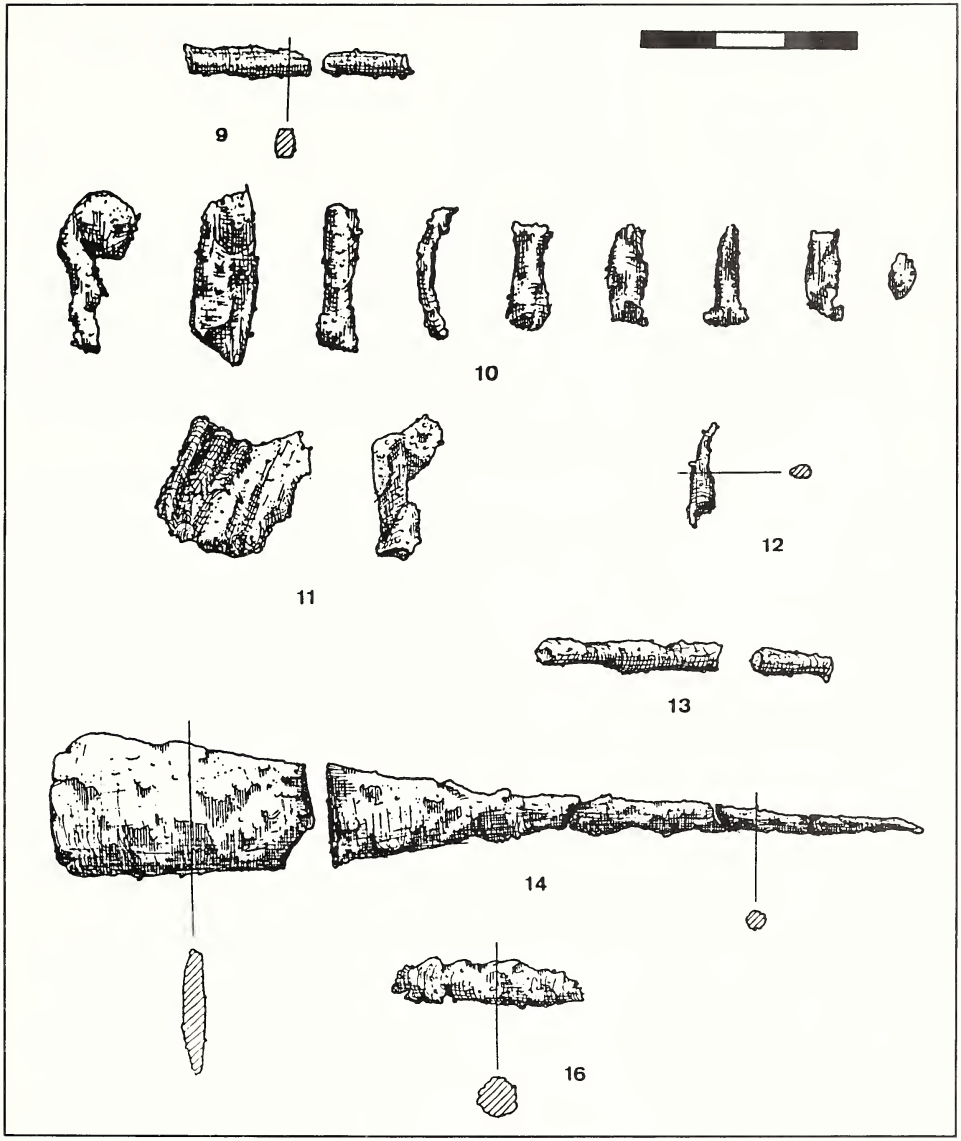

Fig. 2. 9, iron bar; 10, iron pendant fragments; 11, two twisted iron plate fragments; 12, iron wire; 13, iron rod; 14 iron spatula/adze ?; 16, iron bar (scale in cm).

The first millennium AD material from the Congo coast largely predates the occurrance of metal working in southern Africa (Miller & van der Merwe 1994). What material was available for study did not indicate any difference in fabrication technique from that employed at Early Iron Age locations further south. This observation serves to support the hypothesis that the tropical west African coastal corridor acted as a route for the introduction of Early Iron Age metal working to at least the western part of southern Africa (Denbow 1990).

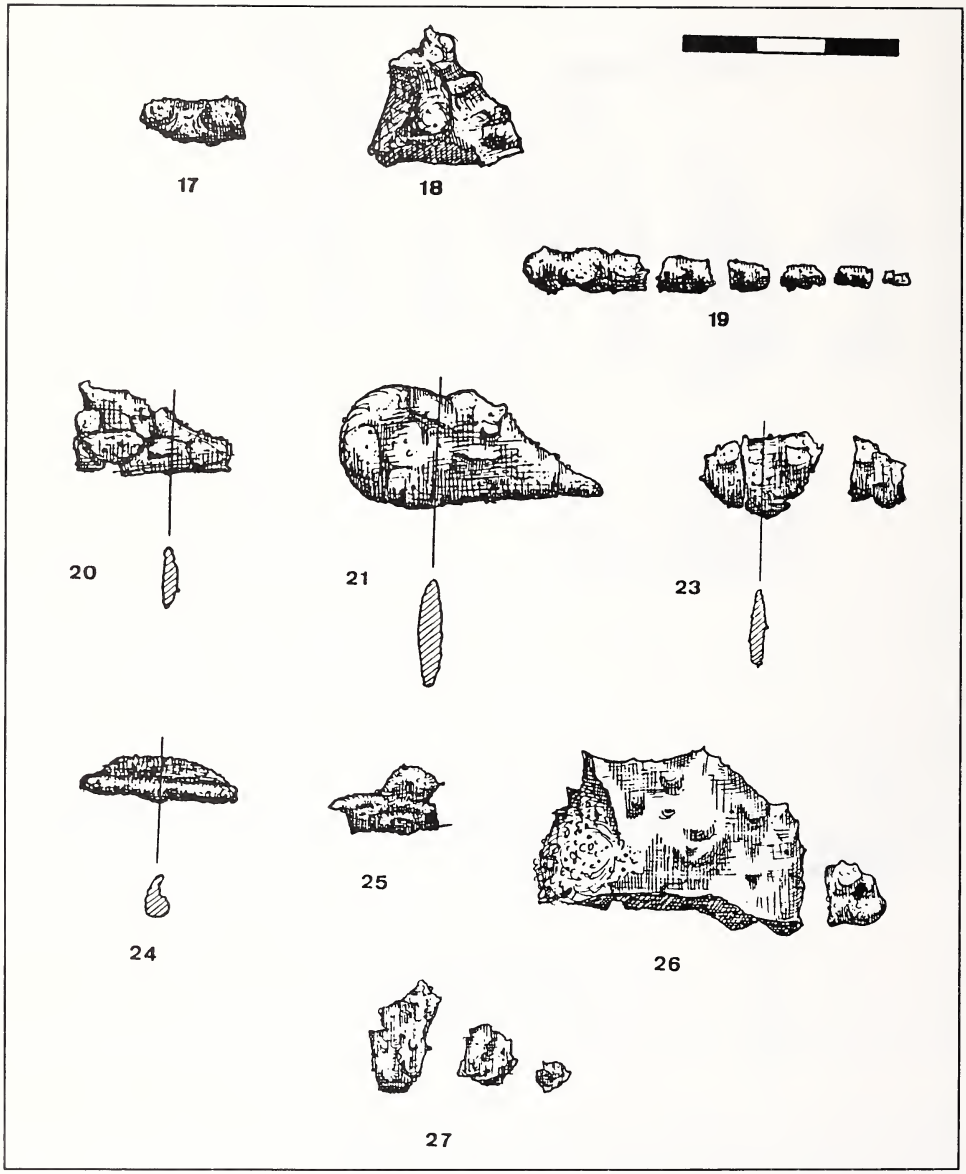

Fig. 3. 17, slag nodule; 18, slag nodule; 19, iron point; 20, iron arrowhead; 21, iron spatula; 23, two fragments of iron plate; 24, iron strip; 25, iron fragment; 26, two slag nodules; 27, three fragments of iron plate (scale in cm).

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Fig. 4. Polished transverse section through iron bar, Cong 5, from Loubanzi, showing the squared-off end (28 X).

Fig. 5. Polished longitudinal section through iron bar, Cong 5, from Loubanzi, showing typical elognated two-phase bloomery iron inclusions consisting of wüstite droplets in dark glass (360 X).

Fig. 6. Polished longitudinal section through iron bar, Cong 5, from Loubanzi, showing fractured and rounded two-phase inclusions indicative of heavy hot working (225 X).

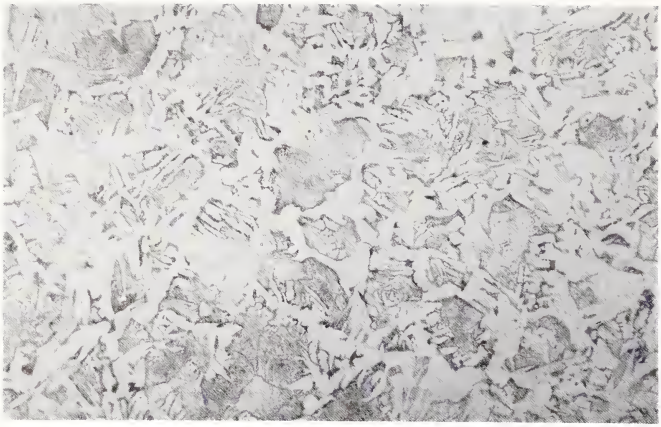

Fig. 7. Longitudinal section through iron bar, Cong 5, from Loubanzi, etched in nital, showing area of approximately 0,2 % carbon composition (450 X).

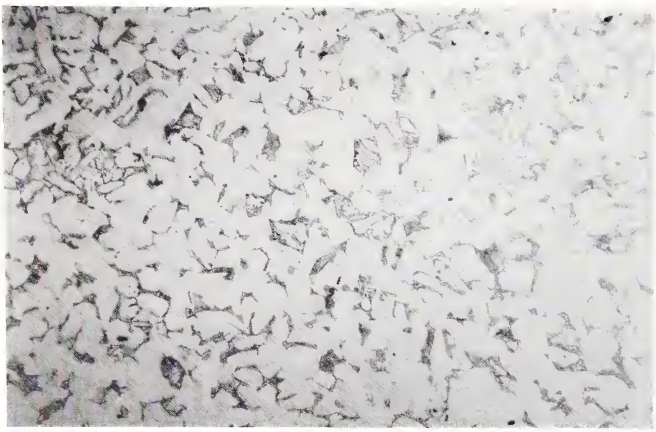

Fig. 8. Longitudinal section through iron bar, Cong 5, from Loubanzi, etched in nital, showing area of approximately 0,1 % carbon composition (450 X).

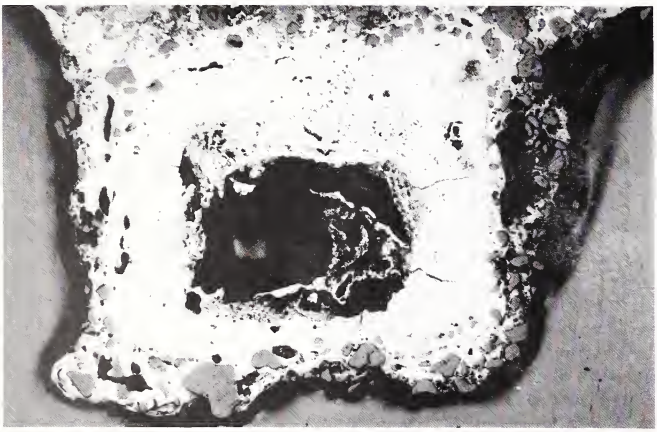

Fig. 9. Polished transverse section through corroded square wire, Cong 7, from site B.P. 113, showing outline of neatly forged square wire preserved in the corrosion product (28 X).

Fig. 10. Polished logintudinal section through corroded iron wire, Cong 7, showing residual iron grains at high magnification (720 X).

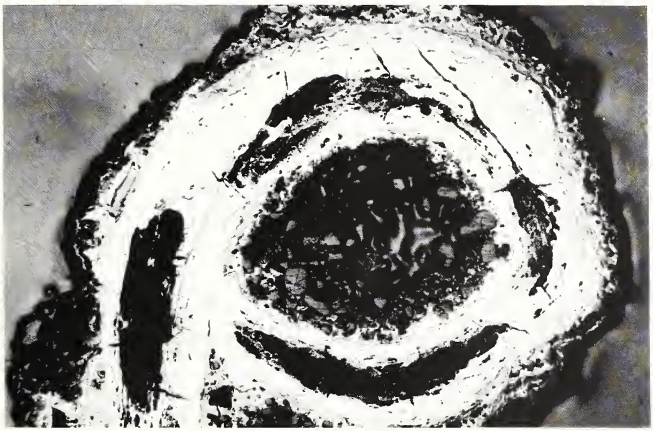

Fig. 11. Polished logitudinal section through the eye of pendant, Cong 10, showing neatly forged abutment of folded over end against the shaft (14 X).

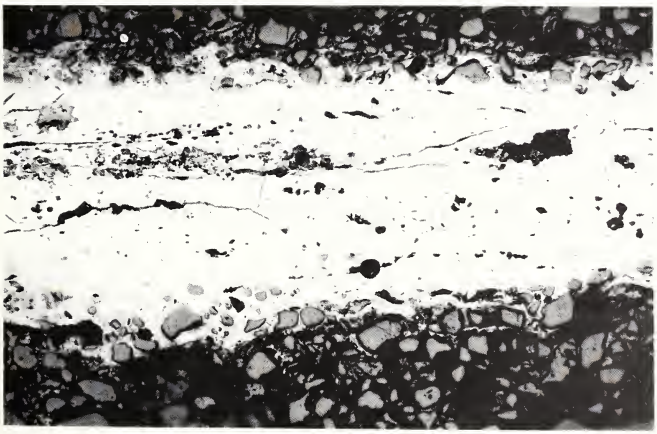

Fig. 12. Polished transverse section through corroded iron spatula/ adze?, Cong 14, showing symmetrically forged cross sectional outline preserved in the corrosion product (28 X).

Fig. 13. Polished transverse section through corroded spatula, Cong 21, showing disruption of the structure through heavy corrosion (28 X).

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Southern African Field Archaeology 7:35-41. 1998.

ARCHAEOLOGICAL INVESTIGATION OF THE BEAULEY EARLY IRON AGE SITE IN THE BLOUBERG, NORTHERN PROVINCE*

J.A. VAN SCHALKWYK

Department of Anthropology and Archaeology,
National Cultural History Museum,
P.O. Box 28088, Sunnyside, 0132

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ABSTRACT

A recent survey of the Blouberg/Makgabeng area of Northern Province has revealed a number of Early Iron Age sites. So far preliminary excavation has taken place on two of these. The site under discussion here, situated on the farm Beauley, is radiocarbon dated to the 10th century AD. Analyses of the pottery further links this site to the Early Iron Age. Other cultural material retrieved from the site includes iron objects, iron slag, tuyères, worked bone and ostrich eggshell beads.

INTRODUCTION

Over the last few decades, various scholars have researched the Early Iron Age in the northern and western parts of Northern Province (Meyer 1980; Hanisch 1979, 1980), in the Limpopo river valley (Prinsloo 1974), in the Soutpansberg and the Lephalala River (Aukema, in Huffman 1990b). However, very little research has been done in the intervening area (Fig. 1). A recent survey of this area, more specifically the Blouberg/Makgabeng area, revealed a number of sites with Early Iron Age ceramics. Although about ten such sites are known, preliminary excavations have been carried out on only two.

The area under consideration forms part of the larger Pietersburg plateau. The geology of this flat land is mostly alluvium of Quaternary age, with some diabase intrusions (Brandl 1986:26). Being fertile and easy to cultivate, these alluvial soils must have been part of the attraction for Early Iron Age agriculturalists to settle here.

The Blouberg/Makgabeng area is situated approximately 100 km northwest of Pietersburg. Here, the plateau is characterised by two topographical phenomena. Blouberg, a mountain range orientated east-west, is made up of a sedimentary-volcanic assemblage, known as the Blouberg Formation, and forms part of the Waterberg Group. It is divided into seven sedimentary members and a volcanic member at the top. In some places the Mogalakwena conglomerate is found (Brandl 1986:24).

The vegetation on the plain surrounding Blouberg/ Makgabeng is dominated by Mixed Bushveld, in contrast to the foot and slope of the mountain that is dominated by Sourish Mixed Bushveld and Sour Bushveld. The vegetation at Makgabeng is also Sourish Mixed Bushveld (Acocks 1975). The Early Iron Age sites identified are usually located on the crossover from Mixed Bushveld to Sourish Mixed Bushveld.

Large areas of the slope of the mountain have been denuded of vegetation, giving rise to erosion and secondary growth, such as "sekelbos" (*Dichrostachys cinerea*). These factors contribute to the site being exposed and therefore prone to erosion. A number of erosion channels cut through the site. This is largely the case with the top (up-slope) part of the site while at the lower part, where there is still some vegetation left, the erosion is less. This makes the detection of the various features all the more difficult. The site is further endangered by a road for a new school.

The site under discussion is located in the opening of a big valley on the farm Beauley 260LR (2328BB - Addney), at the southern foot of Blouberg (Fig. 1). It is situated approximately 200 metres east of the Bosehla River. A number of smaller dongas demarcate the site on the southwestern, southern and southeastern sides. In terms of Early Iron Age settlement preferences, this site offers an ideal location. Maggs (1984:199) indicates similar areas being preferred by Early Iron Age settlers in the KwaZulu Natal area.

Several concentrations of daga were found scattered over the site (Fig. 2). These are taken either as fallen down huts or granary structures. In some cases the pieces of daga are quite thick (up to 150 mm for the thickest pieces). They show impressions of sticks on one side and are smooth on the other. Removal of the daga revealed clay floors below in excavation 1 and 5, though not in excavation 3. The floors were thin, 2 to 3 cm thick, and were laid down directly on the ground.

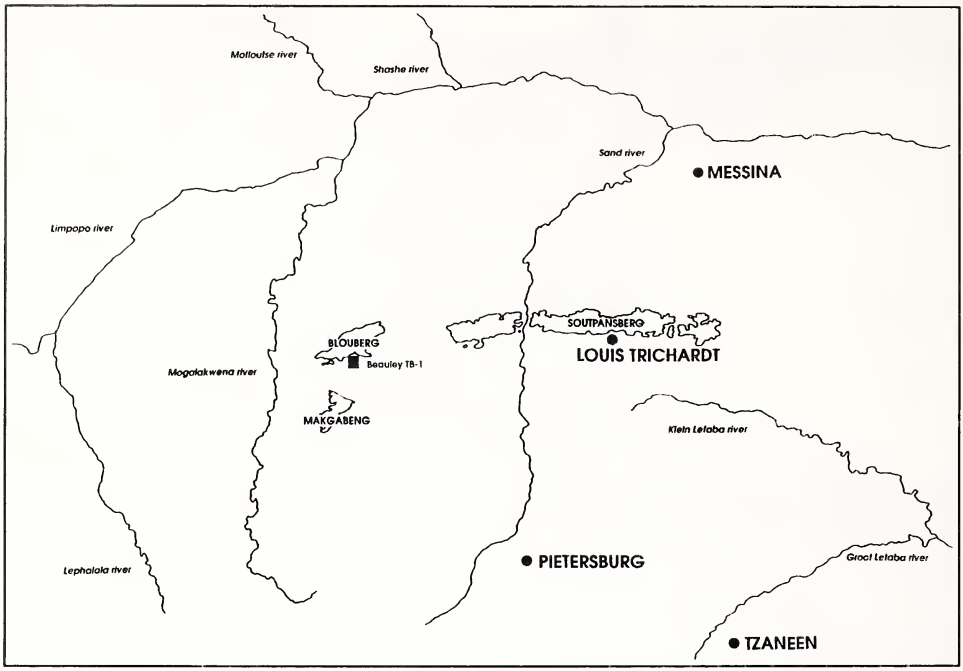

Fig. 1. Map of a section of Northern Province, showing the location of the site under discussion.

Some small concentrations of non-descript daga heaps and piles of stones also occur over the site. These were all plotted, but, due to erosion, it is not always possible to establish the exact size of these features with the result that it is impossible to determine their original function. The absence of a floor below the daga in these cases seems to indicate that they might have been small granaries. The pile of stones might have been the base for the granary. A platform of sticks is laid over this, and is then covered with mud, accounting for the similarity between the daga found here, with that on the larger concentrations.

THE EXCAVATION

This site covers roughly 200 x 150 m (Fig. 2). It was decided to lay out a grid of 2 x 2 m squares. In all, five blocks were excavated.

The floor excavations

In Excavation 1 (TB1/1 - M10) a 2 x 4 m block was laid out over a concentration of hut daga. Removal of the daga revealed the remains of a thin clay floor. It was in such a bad state of preservation that it was impossible to determine its size. Only a few rather small potsherds were found, and it was decided to move the excavation lower down the slope to where the chances of the deposit being retained were better because of more vegetation.

A block of 3 x 4 m was set out over a concentration of daga for Excavation 3 (TB1/3 - D49). No floor was found, but below the daga a shallow pit, 1,03 m in diameter, produced a large number of pots (Fig. 3). In fact, the better part of the pottery assemblage was found here. The relationship of the daga to the pit is still unclear.

Excavation 5 (TB1/5 - Ee51) was a 2 x 4 m square over a concentration of hut daga on a thin floor. The diameter of the existing part of this floor was 1,35 m. Apart from some ceramics and pieces of tuyères found on the floor, two pieces of pole were found protruding through the floor. These were identified as hut poles and one has been dated to AD 962. In one section of the floor, a shallow depression with a raised clay rim occurs. This is approximately 30 cm in diameter and it presumably was a hearth. As the floor was not complete, it is impossible to give an indication of its location relative to the rest of the structure.

Midden excavations

On the basis of some large pieces of shaped clay found in the immediate vicinity, the occurrence of a smelting furnace was suspected here. Excavation 2 (TB1/2-W38) was a 2 m x 4 m block that was excavated in 10 cm layers. A large number of potsherds, pieces of tuyère and slag were found. A deep pit was found in the southeastern corner of the excavation. It contained soil with what appears to be a very high ash content. The pit

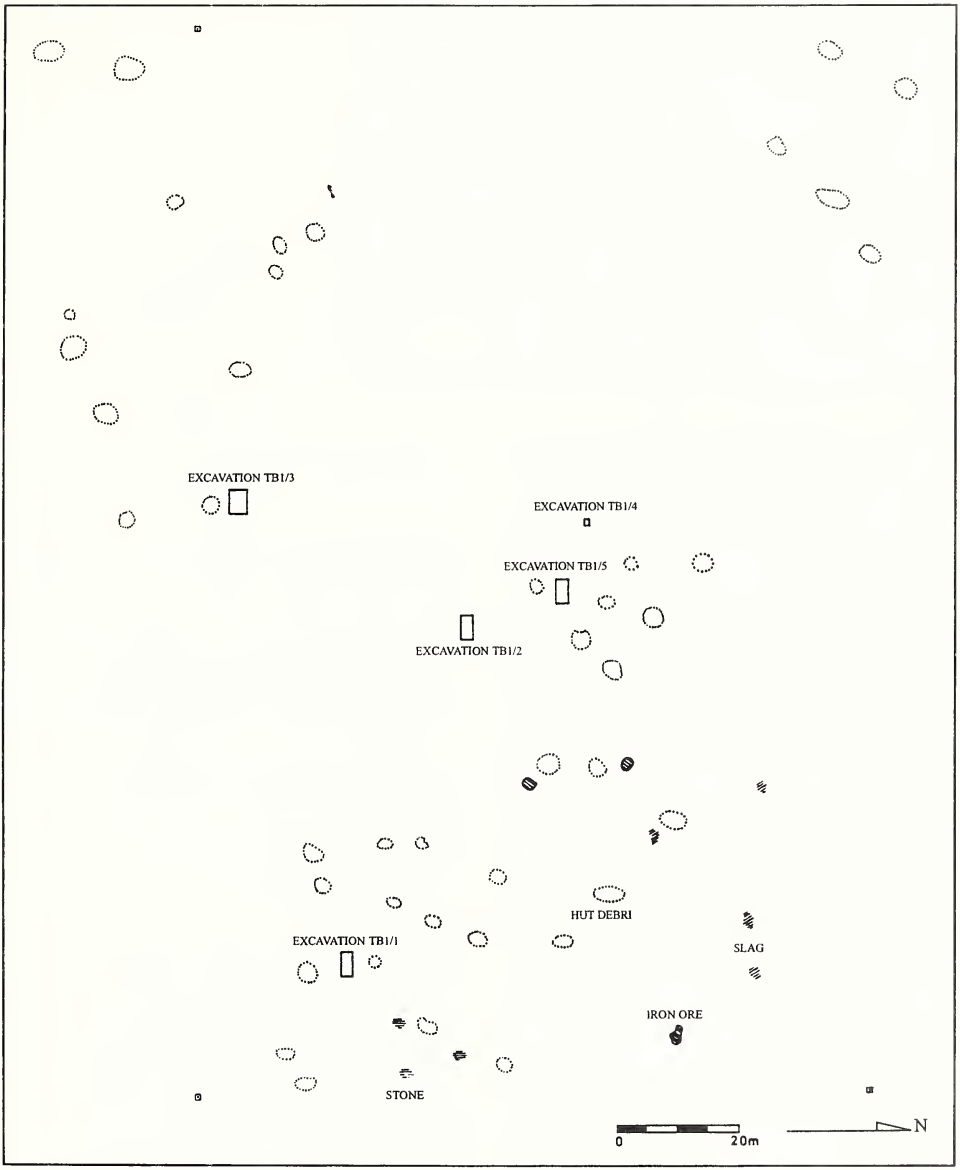

Fig. 2. Map of the site of Beauley (TB1).

pit reached a depth of 49 cm below the current surface.

Two pots were protruding from the ground and were treated as Excavation 4 (TB1/4). As no other features could be detected, the pots were excavated in a 1 x 1 m square block to establish context. None was found, except for their position relative to other features.

THE FINDS

Pottery

A large number of potsherds were found. Most of the surface material was too fragmented to be of use in the analysis. Some of the surface material shows Moloko

Fig. 3. Excavating a concentration of daga, revealing some pottery below it.

characteristics similar to those found at Icon (Hanisch 1979). These were discarded for purposes of analysis, however.

The pottery was analysed according to procedures proposed by Huffman (1980), but not strictly adhered to. In these procedures, multidimensional types are formed by using different independent variables: decoration layout, decoration and vessel profile.

After reconstruction, it was possible to identify 43 different vessels, six of which do not have any decoration. A further four shards could be allocated to probable classes on the basis of decoration motifs alone, bringing the total number of decorated vessels to 47. Some of the pottery has a very weathered and brittle texture, with a pitted surface.

Incision was the only decorating technique employed. The most common motifs are bands of incised lines and cross hatching on the lip and shoulder of the pots. It was possible to group the area of decorations into three main groups:

Area 1: decoration on the lip or immediately below the lip.
Area 2: decoration on the neck.
Area 3: decoration on the shoulder.

Layouts were defined by combination of decoration areas and five modes were identified:

Layout 1 - Decoration area 1.
Layout 2 - Decoration area 2.
Layout 3 - Decoration area 3.
Layout 4 - Decoration area 1 & 3.
Layout 5 - Decoration area 1, 2 & 3.

Five basic profile shapes were recognised in the Beauley assemblage:

1. pot with an everted neck and a rounded shoulder.
2. pot with an everted neck and a shoulder that is well defined.
3. pot with a straight neck.
4. beaker with near vertical sides and round base.
5. incurved bowl.

The intersection of profile and layout modes produced a possibility of 75 classes, of which nine are represented. The following classes were identified:

1. Pot with an everted neck and a rounded shoulder, with a band of decoration on or immediately below the rim, motifs on the neck, followed by a band on the shoulder (2 - Fig. 4:3).
2. Pot with an everted neck and a rounded shoulder, with a band of decoration on or immediately below the rim, and a band of decoration on the shoulder (19 - Fig. 5:2, 5).
3. Pot with an everted neck and a rounded shoulder, with a band of decoration on or immediately below the rim (4 - Fig. 4:4; 5:1, 4).
4. Pot with an everted neck and a shoulder that is well defined, with a band of decoration on the neck (1 - Fig. 4:2).
5. Pot with an everted neck and a rounded shoulder, with a band of decoration on the shoulder (1).
6. Pot with an everted neck and a rounded shoulder, with a band of decoration on the neck (1 - Fig. 4:5).
7. Pot with a straight neck and a band of decoration on or immediately below the rim (4 - Fig. 5:3).
8. Beaker with near vertical sides and round base, with a band of decoration below the rim (4 - Fig. 4:1).
9. Incurved bowl with a band of decoration on or immediately below the rim (1).

To these I have added four undecorated classes:

10. Pot with an everted neck and a rounded shoulder (1).
11. Pot with a straight neck and poorly defined shoulder (3).
12. Open bowl (1).
13. Incurved bowl (1).

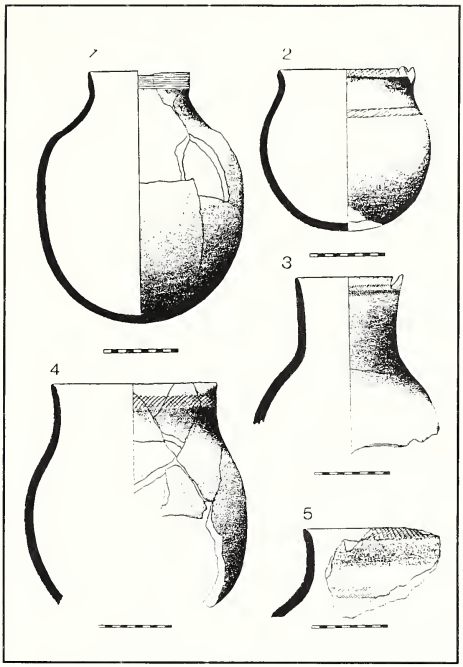

Fig. 4. Ceramic classes from Beauley: Class 1:3; Class 3:4; Class 4:2; Class 6:5; Class 8:1.

The data shows that the most characteristic vessels are from class 2, with classes 6, 7 and 8 as the second most numerous classes. Based on the analysis, the Beauley assemblage shows a resemblance to the ceramic from Klingbeil in the Lydenburg area (see Evers 1980).

Iron smelting

Large quantities of slag occur in three concentrations on the northeastern side of the site. More centrally situated, two concentrations of ore (magnetite) were identified. However, unlike Whitelaw (1994:41), it was impossible to determine the significance of the position of these areas within the larger sites, as the position of the cattle byre could not be determined.

Pieces of tuyères were recovered in the excavations as well as on the surface of the site. They were fractured, however, and no measurement could be derived from them. The tuyères occur in large enough quantities to indicate that they were made and used on the site.

Faunal remains

Only a few fragmented and brittle pieces of bone were excavated. None of these have any identifying features. The lack of faunal material is, for the larger part, attributed to the acidic soil, though the working of other factors is not excluded.

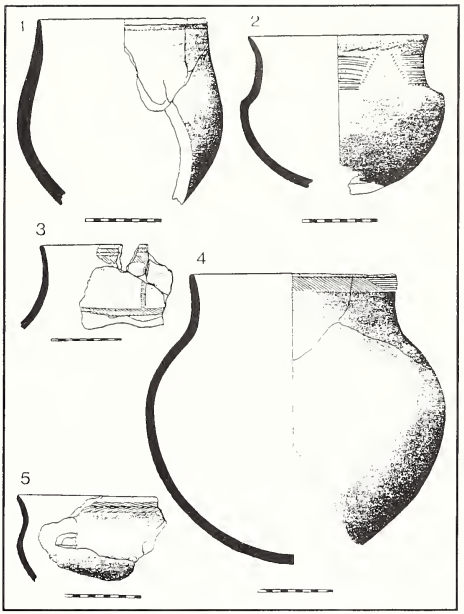

Fig. 5. Ceramic classes from Beauley: Class 2:2, 5; Class 3:1, 4; Class 7:3.

Beads

Four ostrich eggshell beads and two shell beads were found, all of which came from excavation TB1/2. They vary between 7,4 mm and 9,0 mm in diameter.

One big copper bead (10,6 mm diameter) was found on the surface of the up-slope part of the site. However, being a surface find, its relationship with the site, if any, is unknown.

Worked stone

Two pieces of soapstone were found on the surface, both of which are smooth and bear crossed incised lines. These might have been ornaments of some kind as their inner diameters (approximately 10 mm) are too small to have been part of a pipe for smoking.

A small, shaped, flat piece of stone was found. Unfortunately, it was broken and not all the pieces were retrieved. In shape, it looks like contemporary pieces that are used in shaping and burnishing pottery. In fact, it was found in TB1/3 among a large number of broken pots.

Some MSA and LSA flakes and tools occur on the site. However, no conscious effort was made to collect these and only the ones retrieved by archaeological methods were kept.

DISCUSSION

Two types of structures could be identified at Beauley: huts and granaries. The size of the structures is not clear,

but it had well-defined floors, with walls consisting of poles plastered with clay. Some additional features, such as hearths and pits, were uncovered. Presumably the pits might have been storage pits of some kind, possibly for grain. Whitelaw (1993:75) reports similar features from Nanda in KwaZulu-Natal, and Huffman (1990a) from Broederstroom west of Pretoria. It is interesting to note that in the past the local people (Hananwa) also dug pits in the cattle byre in which grain baskets were put (Moifatswane 1993).

An indication of activity areas and their possible relationship to each other can be derived from the plan drawing (Fig. 2). There seems to be a definite clustering of structures in at least three different areas on the site. In each of these, the size variation of the remains might be an indication of different functions for the structures. The larger structures might be huts, with a number of smaller ones, possibly granaries, arranged close to them.

Features relating to iron working are found more to the northern side of the site, though the remains of what were possibly a furnace have been located more to the centre of the site. The iron ore, slag, tuyères and pieces of furnace found on the site seem to indicate that iron was produced here. This fits in with what was found at Early Iron Age sites in Natal (*eg*, Maggs 1984, 1992). Huffman (1990a:7) however, argues that iron smelting was surrounded by ritual prohibitions and therefore would not have been located within the settlement. Being a very large site, this could well have been the case, if the whole site was not inhabited over the same period.

An analysis of the pottery places this site in the Early Iron Age. The dating and ceramic style indicate that the Beauley site is contemporary with Klingbeil sites in the Lydenburg area. Klingbeil eventually seems to develop into the K2 tradition. Charcoal from the excavation was submitted to the CSIR in Pretoria and yielded the following results. Charcoal from TB1/2, close to some slag and pieces of tuyères, 1120 $\pm$ 50 BP (Pta-5948); part of a wooden post sticking through the clay floor in TB1/5, 1135 $\pm$ 50 BP (Pta-5951); and charcoal from TB1/3 gave a date of 850 $\pm$ 50 BP (Pta-5947). These are calibrated, respectively to, TB1/2 - AD 902(976)1003; TB1/5 - AD 917(962)976; and TB1/3 - AD 1188(1237) 1262, with the central intercept in brackets.

The excavations at Beauley confirm much of what is already known about the Early Iron Age in other parts of the country. However, the site is important as it fills the spatial and temporal gap between the sites in the Soutpansberg, the Limpopo valley and those in the Waterberg.

It is clear that further excavation is necessary on the site. The biggest problem to date is obtaining a larger pottery assemblage. Secondly, more information on the precise type and arrangement of structures at the site is needed. Thirdly, it will also be necessary to compare the site to other sites found recently in other areas of Blouberg.

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EXCAVATING NDZUNDZA NDEBELE IDENTITY AT KWAMAZA*

M.H. SCHOEMAN

Department of Historical Anthropology, Albany Museum, Somerset Street, Grahamstown, 6139

e-mail: amms@warthog.ru.ac.za

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ABSTRACT

KwaMaza is a Ndzundza Ndebele site in the Steelpoort River valley and has been dated, using oral histories, to the period between the late 1600's and the early 1800's. This paper documents the excavations and highlights the different identities expressed in a range of material culture categories from KwaMaza; settlement pattern, house form, midden structure and ceramic style. The settlement pattern and houseform express a 'Nguni' identity, the middens express a particular 'Ndebeleness' and the ceramics are 'Pedi', thus reflecting a more regional identity.

INTRODUCTION

KwaMaza is located on the western margin of the Steelpoort River valley, on the lower slope at the eastern foot of the Bothasberg in Mpumalanga (Fig. 1). The valley is approximately 25 km wide at this point and the Steelpoort River is 10 km from the site. A perennial stream, the Sakazana, flows 500 m to the south of KwaMaza. The site clusters along the basal contour of the mountain range and covers a large area (Fig. 2).

KwaMaza was first pointed out to C.J. Van Vuuren by Ndzundza Ndebele informants in 1993. Oral history recalls that the Ndzundza first moved to KwaMaza under the leadership of Bongwe. The name Maza appears in the "izibongo" of Somdeyi, the brother of Siboko, who was the last ruler at KwaMaza in the early 1800's. Using cyclical male initiation schools, the initial occupation at KwaMaza can be dated to the period after Bongwe's 1675 Dlowu initiation school (Table 1). The end of the KwaMaza occupation dates to the "mfecane" period in the 1820s. An old song "incema efitjane ekwasakazana" also makes reference to the name Maza and of "Sakazana", (Skilferlaagtespruit) which flows close to the southern side of the site (Van Vuuren & Schoeman 1996).

We can be confident about the geographical identification of KwaMaza because its historical power holds a continued place in the memory of the Ndzundza. This power is recycled, as indicated by the occupation of the site by a Ndzundza prophet in the early 1990s. She repeatedly acknowledges a relationship between the ancestral power of KwaMaza and her visions which she claimed guided her to the site in the first place. She further believes that, by living on the site of her ancestors, she will be able to redress the past oppression of the Ndzundza, and bring unity between black and white people. Today the site is locally known as "KwaMaza emlotheni" (KwaMaza on the ashes). This is a reference to the ashy soil and the numerous large ash heaps on the site.

ORAL HISTORY

Oral accounts state that the Ndzundza Ndebele moved to KwaMaza during the reign of Bongwe. Bongwe reigned for only three years, after which another nine leaders in five generations presided over the settlement at KwaMaza, a large number of them being regents (Table 1). During this occupation, spanning almost 150 years, the Ndzundza Ndebele were continually joined by a large number of people of other political-ethnic origins. Van Vuuren (pers. comm.) suggests that the atypical Ndebele clan names originated during this period and reflect Swazi, Kopa, Pedi and even Tswana people joining the core group. Oral accounts recorded by Van Vuuren (1985:40) state that the total settlement spread over a number of hectares and this is borne out by the large size of KwaMaza recorded in this research.

The last leader at KwaMaza was Magodongo (Table 1). Magodongo, succeeded Mrhabuli, his father Mgwezana's brother. The "izibongo" recalls that Magodongo became impatient whilst waiting to have the mystical teachings of the kings bestowed on him by the regent Mrhabuli, and killed him. A prophecy was passed on to him, stating that he would be bothered by black and red ants and then eaten by white ants that would

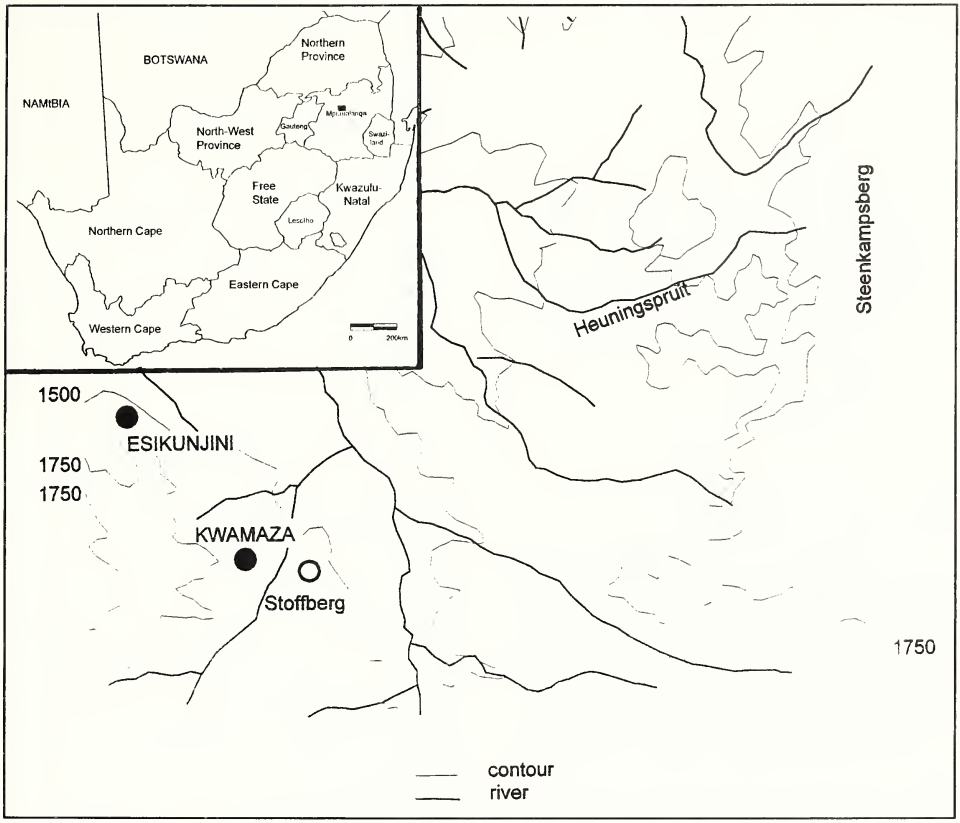

Fig. 1. Research Area.

destroy the kingly line. Consequently, the royal mystical teachings were not passed on to him and were lost. The interpretation of this prophecy is that the black ants represented the amaNdebele of Mzilikazi, the Swazi and the Zulu and the red ants the Pedi, while the white ants were the white settlers (Fourie 1921:36-38; J. Mahlangu pers. comm.[1]).

True to the prophecy, Magodongo was attacked at KwaMaza, by Mzilikazi's soldiers. He escaped, but both he and his son Mloyi were caught a few days later and tortured to death at Matyaneni in the Tautesberg area. Under Magodongo's son Siboko (Table 1), the Ndzundza Ndebele fled north to Mgambana, a Pedi leader in the area of present day Marabastad, where they stayed for an unspecified period. Siboko and his followers returned to KwaMaza where they were again attacked and he and a large number of his followers were killed. This signalled the final end of the KwaMaza occupation (Fourie 1921:38).

Mzilikazi's attack on KwaMaza and his occupation of Mpumalanga is a well remembered event. Its prominence in both the Zimbabwe Ndebele (Rasmussen 1975) and Ndzundza oral traditions suggest that at the time, the Ndzundza were a key group in the area, since for the Zimbabwe Ndebele, at least, the defeat of a weak group would not have been memorable, and thus not as prominently recorded in their own oral histories.

Whilst there is general agreement that these events significantly disrupted the area in the 1820s, there is little agreement on the exact dates for these disruptions. The main reason for this lies in the contradictory accounts as to whether Mzilikazi's Ndebele or the Ndwandwe were responsible for the major attacks in the area. Rasmussen (1975), on the one hand, backs Mzilikazi's Ndebele, whilst Delius (1983:21-23) on the other, argues that the Ndwandwe, under Zwide, were the principal destroyers of the neighbouring Pedi polity.

Delius (*ibid*) argues that the Ndwandwe raided the adjacent Pedi area prior to the attack by Mzilikazi. Delius (1983:23) uses the date for the Ndwandwe return

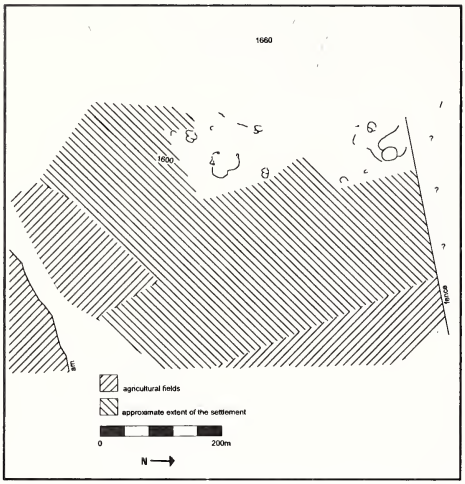

Fig. 2. KwaMaza in topographic context.

back towards Zululand, under Zwide's son Sikhunyana,in calculating a possible date for their attack on the Pedi. The Ndwandwe engaged in battle with the Zulu army north of the upper Pongola in June 1826. Delius, therefore, dates the Ndwandwe assault on the Pedi to approximately 1825. Mzilikazi's raid of the area, therefore, would have occurred in the period after 1825.

Rasmussen (1975:86-87), however, dates Mzilikazi's first attack on the Ndzundza to either 1821 or 1822, based on the Arbousset and Daumas' 1846 record of a solar eclipse shortly before the invasion by Mzilikazi's soldiers (Arbousset & Daumas 1968). The only total eclipse in the area at the time was on 14 March 1820. These dates, whether 1821 or 1825, for the end of the KwaMaza occupation allow a resolution that is obviously not available from radiocarbon dating.

ARCHAEOLOGY

Mapping and excavations at KwaMaza focused on two prominent stone wall and midden clusters located at the highest point of the site (Fig. 2). Each cluster has at least one large, primary enclosure with several smaller stone wall enclosures distributed around them. The two clusters are about 80 m apart. These clusters have been named KwaMaza A and KwaMaza B (Fig. 3). Most of the stonewalling occurs on the basal contour or immediately below it and there is little stonewalling elsewhere. It is clear that as one moves downslope through the site to the east, walling diminishes and the middens become less prominent. The lower part of the site is principally marked by shallow middens and ceramic scatters.

The stone walls that make up the KwaMaza B central enclosure are substantially lower and in poorer condition than the stone walling of KwaMaza A, and may have been 'robbed'. However, where middens cover the walls at KwaMaza B, they are still intact. On the basis of this difference in wall quality, I sampled both clusters in order to investigate the possibility that they marked shifting centres.

KWAMAZA A - 2529BD3 A

KwaMaza A is made up of three homesteads around a large central enclosure. It has two other features in the form of terraces associated with domestic areas, and middens. The location of KwaMaza A on the highest point of the site, and the more exclusive use of walling, could indicate that it was occupied by the ruling elite, since the highest area of sites located on slopes are generally high status positions (*cf.* Kuper 1980).

Features

Central Enclosure

The central enclosure is built out of a low, 0.8 m high stone wall and consists of an upper and a lower compartment (Fig. 3). The upper compartment is open on the upslope side with a maximum width of 44 m across. The walls of the upper compartment end in two small circular stone enclosures, with entrances into the upper compartment. Two further circular enclosures are built into the right[2] hand wall of the upper compartment. There is an entrance into the larger of these from the upper compartment. Another entrance into the main upper enclosure is located in the right hand wall. The lower compartment is approximately two thirds of a circle that measures 25 m across its maximum diameter (Fig. 3). Apart from the open connection between the upper and lower compartments, there are no other entrances into the lower compartment.

Three areas in the central enclosure were excavated in order to try and establish their function. The first was the small circular enclosure at the end of the right hand wall of the main upper compartment (Fig. 3:1). Here a 1x1 m square was excavated and two stratigraphic units recorded. The upper 0.1 m consisted of grey surface wash that lay over a hard red soil. A second excavation was undertaken in the enclosure in the right hand side of the wall (Fig. 3:3). The first 50 mm consisted of the grey surface wash which was again followed by the hard red soil. This trench yielded some ceramics but there was no other evidence that indicated the specific function of the structures.

Another 1x1 m square was excavated along the line separating the upper and lower compartments. The top 40 mm consisted of grey surface wash followed by hard red rocky soil. This excavation yielded ceramics, but no dung was found here, nor was there any indication of cattle dung anywhere else in the central enclosure.

The Kraals and Homesteads

Three homesteads are located around the central assembly area, one on either side and one upslope (Fig. 3). These homesteads consist of a central stone walled

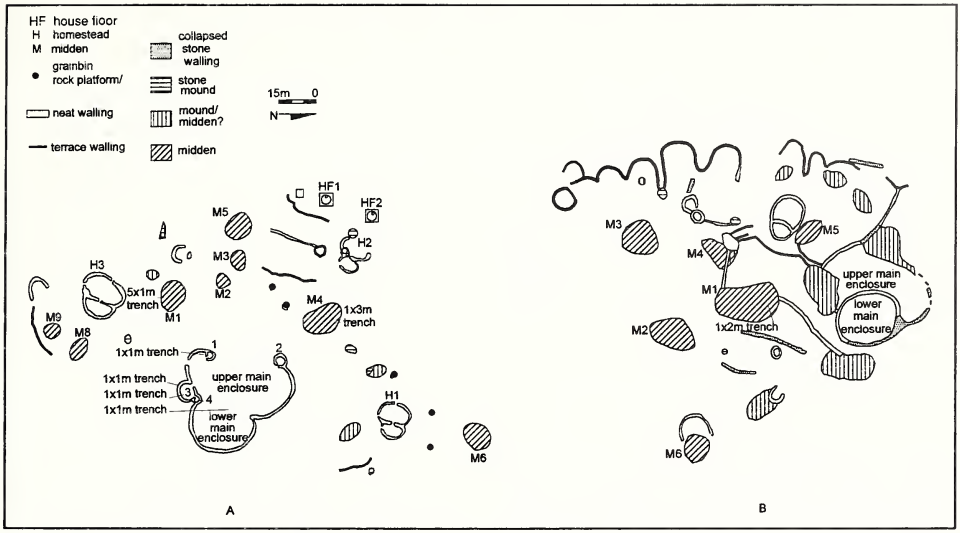

Fig. 3. KwaMaza settlement plan.

kraal ("isibaya"), with associated domestic areas and middens, and for Homesteads 1 and 2, stone grain bin bases. The layout of the kraals is similar to that of the large central enclosure, but with the central divide between the two compartments more complete. There are two entrances to each kraal; one on the right of the upper compartment and another at the top. Smaller enclosures were built into the wall of the Homestead 2 kraal in the same positions as compartments 3 and 4 in the main enclosure (Fig. 3). The kraals in Homesteads 1 and 2 had thick stands of "Tamboekie" grass (*Hyperthelia Dissoluta*), growing within the enclosures and rooted in dung.

Homesteads 1 and 3 were built on relatively flat areas but Homestead 2 was built on the basal slopes of the Bothasberg. In order to provide suitably flat platforms for houses, this area had been terraced. These were built by cutting back into the slope and moving the soil forward. Both the upslope and downslope sections were then stabilised with stone terrace walling. Homestead 2 may have been occupied by the most senior man and his wives, because of its height relative to the other homesteads, and also its position immediately above the entrance to the assembly area and court. The highest terraces in Homestead 2 were examined to recover house remains (Fig. 3:HF1 & HF2).

House Form

Two house floors were located, excavated and mapped (Fig. 4). Although the houses had not burnt down, the floors and features on them were reasonably intact. Both house floors had entrances that faced the kraal. Each floor had a raised fire bowl located centrally in the back quarter of the house and firestones were found in each of these. On House Floor 1, the back quarter was demarcated by a low "dhaka" ridge that ran from either side of the fire bowl to the outer wall. A small amount of pole impressed "dhaka" was found on both floors. Ceramics were found on both floors, and two copper bangles were recovered from House Floor 2.

Middens

One of the striking features at KwaMaza A is the prominent middens and soil mounds, and at least nine of these features have been identified. These are located between the main central enclosure and the terraces of Homestead 2 and around the kraals of Homestead 1 and 3. Trenches were excavated in Middens 1 and 4 (Fig. 3:M1 & 3:M4).

Midden 1 was excavated through a 1x5 m trench. The depth of the deposit varied; the deepest, at 0.84 m, was downslope to the east and the shallowest (0.2 m) was in the west. Stratigraphy was simple. The surface layer (Surface) consisted of an ashy deposit, while the second layer consisted of a thick red soil (Red 1 and Red 2), which was broken at the eastern end by a band of ash (Ash 1). Sterile red soil (Red 3) at the base marked the end of the cultural deposit (Fig. 5).

A 1x3 m trench was excavated into Midden 4. The deposit was 0.8 m deep on average. The first layer (Surface) consisted of a grey ashy deposit, underlain by a thick red soil (Red 1). The third layer (Ash 1) is noticeably ashy and was underlain by sterile red soil (Red 2). From the section it is clear that a high density of stones occurred around the interface between Red 1 and Ash 1 (Fig. 6).

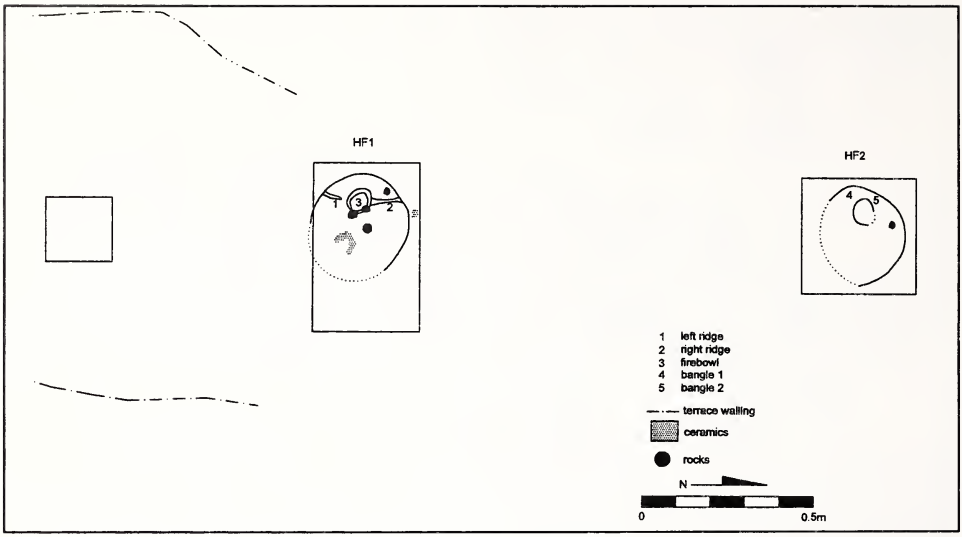

Fig. 4. KwaMaza: A, Domestic Area.

The Finds

Ceramics

Pottery was found in all the excavations (Fig. 7). Out of a total of 1019 shards recovered, only 70 (6.8%) were decorated. Ninety (8.8%) shards were identifiable rim and neck shards. Of these 77 (85.5%) came from jars, and 30 (38.96%) of these were decorated. Twelve (13.3%) shards came from bowls, and 5 (41.6%) of these were decorated. The jars were coarsely made, thick walled vessels, whereas the bowls were neatly made with thinner walls. Due to the small size of some of the decorated shards, not all could be allocated to a multi-dimensional class.

On the basis of motifs alone, 17 shards could be identified as Early Iron Age Eiland ceramics. These shards were too small to establish ceramic types. Three shards could represent an even earlier Iron Age phase. The rest of the assemblage consisted of Late Iron Age ceramics. Ceramic Types 2 (20 shards), 4 (2 shards) and 5 (2 shards) were present.

Other Finds

The other finds from KwaMaza A are listed below.

Midden 1

Surface: 1 metal spear shaft, 1 broken clay spoon, 1 smoothed stone (possibly an upper grindstone), 1 broken upper grindstone, 1 abraded ceramic shard and 1 stone flake.

Ash 1: 1 piece of iron wire, 2 pieces of a broken ceramic spoon, 1 piece of broken ostrich eggshell and 1 broken upper grindstone.

Red 2: 2 broken upper grindstones.

Midden 4

Surface: 1 abraded ceramic shard and a miscellaneous piece of iron sheet.

Red 1: 1 piece of worked clay.

House Floor 1: 1 dark blue and two light blue glass beads, a piece of a broken ceramic spoon and a stone floor smoother.

House Floor 2: 2 copper bangles, 67 glass beads (15 red, 15 white, 14 dark blue and 23 light blue) and a stone floor smoother.

KWAMAZA B - 2529BD3 B

KwaMaza B is a discrete section of the site located to the north of KwaMaza A. It is not as well preserved as KwaMaza A and the settlement layout is less clear. It is made up of a large stone walled central enclosure and at least one smaller enclosure. There is a wall that separates the central area from the domestic area, terrace walling, and a number of large middens. The northern section of KwaMaza B is located on another farm and past agricultural activities seem to have destroyed the rest of the site. As with KwaMaza A, its location upslope of the rest of the site suggests that it was occupied by the ruling elite. The walling of KwaMaza B is substantially lower than the walling of KwaMaza A (Fig. 3).

Features

Central Enclosure

The central enclosure consists of two compartments, forming upper and lower lobes, similar to the assembly

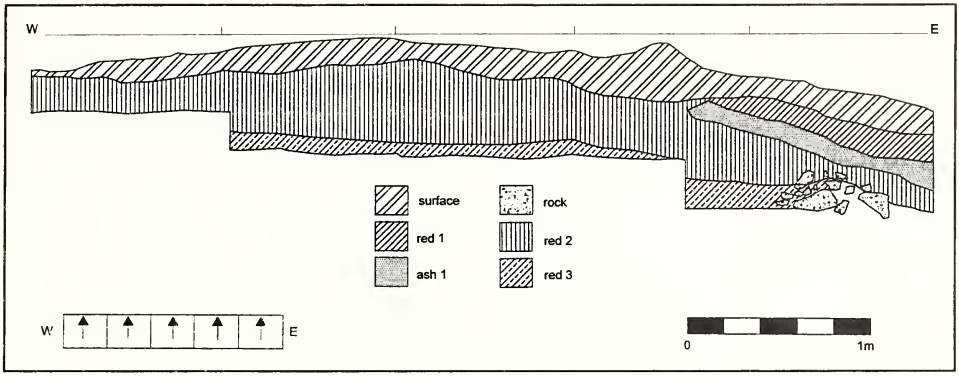

Fig. 5. KwaMaza: A, Midden; 1, Trench; 1, North section.

area and kraals at KwaMaza A. Large portions of both the upper and lower sections of the central enclosure wall are only traceable from a few remaining key stones. This wall, and others at KwaMaza B appear to have been 'robbed', except where mounds and middens cover large sections of the remaining walls. It is, therefore, difficult to establish the position of entrances into the main enclosure (Fig. 3).

The Kraals and Homesteads

There is not much clarity on the spatial layout of KwaMaza B outside of the central enclosure. At least one homestead is located above the central enclosure. This homestead consists of a kraal, with associated domestic areas and middens. The conceptual plan of the kraal is similar to that of the assembly area (Fig. 3).

Up-slope from the assembly area, a number of bays are located at the back of terraces. While no house floors could be found in these bays, the similarity with KwaMaza A suggests that it is a domestic area. This area may have been occupied by the most senior man and his wives.

Downslope from the central enclosure, there are a number of stone walls and middens. The purpose of these walls is not clear. One of the walls might have channelled cattle through the settlement, or simply separated the central area from the surrounding domestic zone.

Middens

There are at least nine clearly identifiable middens at KwaMaza B and five other mounds that may also be middens. The middens are located below the house-terraces and adjacent to or below the kraal. Six of the middens/mounds have formed over stone walling and most of the middens have been extensively burrowed. This is in sharp contrast to the middens at KwaMaza A (Fig. 3).

A 2x1 m trench was excavated into Midden 1. The deposit was excavated to bedrock at 1.18 m. The midden deposit was stratigraphically complex, with a number of distinct layers, and smaller ash lenses. Within layers, deposit was removed in 0.1 m spits. The first layer (Surface) consisted of an uniform ash. At the base of this layer there was a concentration of rocks. The second layer (Red 1) consisted of a red soil with relatively little charcoal and ash. The Khaki Layer, consisted of an artefact, charcoal and bone rich khaki ash deposit. The fourth layer (Brown) was a browner ash. Ash Brown 1 was rich in charcoal and Red 2 was basically sterile. The basal cultural layer, Ash Brown 2 was an ashy charcoal rich deposit (Fig 8).

The Finds

Ceramics

The ceramics were thick walled and coarsely made. Out of a total of 239 shards recovered from Midden 1, 29 (12.1%) were rim and neck shards. Only 22 (9.2%) were decorated. Twenty five (10.5%) shards were from jars, of which 15 (60%) were decorated. Four (1.7%) shards were from undecorated bowls. One possible Letaba shard was found, but was too small to be conclusively identified. At KwaMaza B ceramic only Type 2 (15 shards) were present (Fig. 9).

Fragments of very small ceramic vessels, a very small jar with a band of rim decoration and a very small bowl were found. These were possibly made by children and are therefore not included in the ceramic analysis (Fig. 10).

Other Finds

The other finds from the Midden 1 excavation are listed below.

Surface 0-0.1 m: 5 Middle Stone Age stone tools and 2 shards from a very small ceramic vessel.
Surface 0.2-0.3 m: Slag, 1 ostrich egg shell bead a shard from a very small ceramic vessel.
Surface 0.3-0.4 m: 1 ostrich egg shell bead.

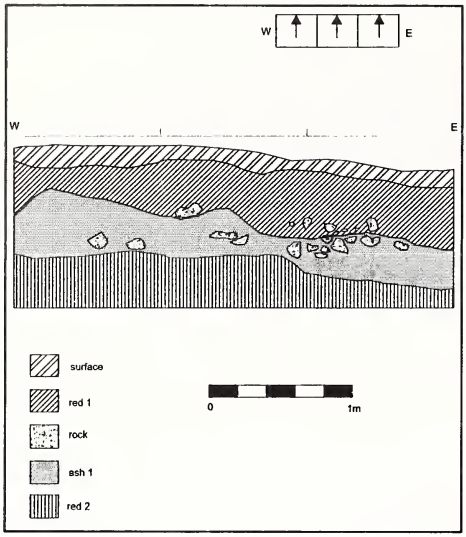

Fig. 6. KwaMaza A: Midden 4 North section.

Table 1. KwaMaza leadership chronology.

Date	Site	Leader	Leader's Regiment Name	Leader's Initiation Date
	Esikhunjini			
		Somdeyi	Thula	1819
		Siboko (regent)	-	-
		Magodongo	Dlown	1795
		Mrhabuli (regent)	Rhasa	1767
1800				
		Dzela (regent)	Dlaza	1763
		Mgwezana	Thula	1759
	KwaMaza	Mdalanyana (regent)	Nghana	1727
1750				
		Maridili (regent)	Phaswana	1723
		Phaswana	Phoko	1719
		Mahlangu	Thula	1699
1700		Sideni (regent)	-	-
	KwaSimkulu	Bongwe	Dlown	1675

Surface 0.4-0. 5 m: 1 shard from a very small ceramic vessel.
Red lens in Surface: 1 upper grindstone.
Red 1: 1 shard from very small ceramic vessel.
Red 3: 1 miscellaneous piece of worked clay.
Khaki 0-0.1 m: 1 small ceramic bowl, 1 shard from a very small decorated ceramic vessel.
Khaki 0.1-0.2 m: 1 broken upper grindstone, 1 shard from a very small ceramic vessel.
Khaki 0.3-0.4 m: 1 stone flake, 1 floor smoothing stone.
Khaki 0.5-0.6 m: 1 copper spiral.

DISCUSSION

The large central enclosure at KwaMaza A has been identified as an assembly area for several reasons. Firstly, this enclosure is open at the upper end and thus would not have functioned effectively as a cattle kraal. Secondly, there is no evidence of dung in the enclosure. The smaller enclosures at the centres at Homestead 1 and 3 functioned as kraals. This interpretation of the large central area as a court or mens meeting place was reinforced by W. Mahlangu, a Ndzundza Ndebele royal "imbongi" who visited KwaMaza in 1995 whilst we were excavating. He also suggested that the two circular stone enclosures at the end of the court walls, would have been occupied by two royal "indunas" who controlled access to the Paramount leader. The circular enclosure in the right wall was said to have been the paramount's house. Ndzundza custom dictates that no-one should know where the male head of a homestead sleeps. He would stay at the court until everyone has gone to sleep and only then would he go to the house of one of his wives, returning to the court before anybody else gets up in the morning.

The spatial layout of KwaMaza B suggests that the central enclosure also functioned as a court, with the adjacent enclosure(s) functioning as a kraal(s). This is suggested by the stone wall that separates the central area from the domestic areas, which could have channelled cattle to the smaller enclosure/kraal, since there is no obvious entrance through the right wall of the main enclosure. The absence of a clear entrance into the right hand side of the central enclosure could, however, be a product of the lack of preservation.

The clear difference in the preservation of the stone walling of KwaMaza A and KwaMaza B suggests that KwaMaza B predated KwaMaza A. It is possible that sections of the central enclosure in particular, were robbed and used to construct KwaMaza A. Ethnography and oral history provides us with potential clues for the occurrence of two 'centres' at KwaMaza. Ndzundza custom dictates that if a king dies the capital should be moved, unless it would not be safe to do so (Fourie 1921:151). If this is the case, only the court is moved from one side of the cattle kraal to the other (*ibid*). Furthermore, although highly speculative, it is possible that KwaMaza A was built on the return of Siboko to the site after the initial attack on KwaMaza by Mzilikazi in the early 1820's. When re-establishing the site, he would have had to move the court in accordance with custom,

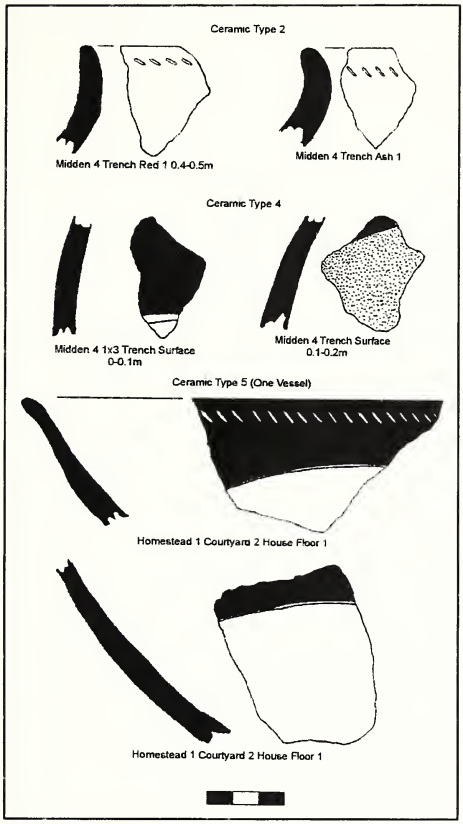
Ceramic Type 2
Midden 4 Trench Red 1 0.4-0.5m
Midden 4 Trench Ash 1
Ceramic Type 4
Midden 4 1x3 Trench Surface 0-0.1m
Midden 4 Trench Surface 0.1-0.2m
Ceramic Type 5 (One Vessel)
Homestead 1 Courtyard 2 House Floor 1
Homestead 1 Courtyard 2 House Floor 1

Fig. 7. Ceramic shards from KwaMaza A.

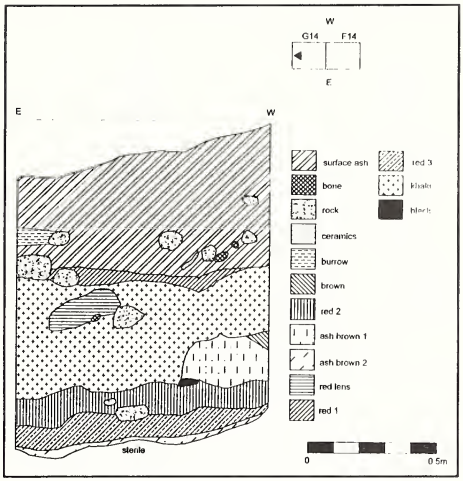

Fig. 8. KwaMaza B: Midden 1, Trench 1, G14 South section.

and this would explain the greater degree of degradation in the walls of KwaMaza B. If KwaMaza A was re-established after the "mfecane", the re-occupation by the royal family is borne out by the use of stone walls, since the general site layout seems to indicate that only the royal section used stone walling during the period.

The settlement layout of both KwaMaza A an B shows similarities to the Nguni homesteads excavated by Hall and Maggs (1979) and Maggs *et al.* (1986). As with the use of stone on Nguni sites, the kraals and assembly areas are demarcated by stone, but not the peripheral domestic areas. The shift of cattle out of the centre in favour of a more overtly political structure could suggest Sotho-Tswana influence, however Kuper (1980:17) suggests that in Sotho-Tswana communities such shifts reflect a political shift to larger-scale political decision-making units rather than identity marking. The shift of the cattle from the centre at KwaMaza, therefore, possibly supports oral history accounts about extensive Ndzundza political power.

The scalloped back courtyards at KwaMaza B might indicate Sotho influence. However, when read in conjunction with the layout of the whole site, especially the absence of stone walls demarcating the domestic areas, and the construction of the houses and housefloor floors, it suggests that their shape is simply the product of excavation into the hill. Above all, the settlement pattern shows no similarities to the 'Pedi' sites excavated by Collett (1982).

The exact shape of the house structures at KwaMaza A is difficult to interpret from archaeological evidence on the house floors. The burning of rondawel houses produces large amounts of collapsed wall "dhaka" (mud plaster), whereas thatched beehive houses would leave few traces of "dhaka". The houses at KwaMaza A appear not to have burnt down, thus the lack of preserved wall "dhaka" could be problematic as evidence for house form. However, at UmKlaarmaak, the last site in the sequence, the floors are not baked, and the houses, therefore, also did not burn down but, nevertheless, large amounts of wall "dhaka" were preserved.

The absence of "dhaka" from the KwaMaza A floors could indicate a structure built predominantly of grass over a pole frame. This would be similar to Nguni houses that are traditionally beehive in shape, in contrast to Sotho houses that are cone-on-cylinder, with plastered pole and "dhaka" walls and a thatch roof. Furthermore, the central internal fire-bowl and apse demarcated by a ridge ("umbundu") at the back of the house, is similar to the floors excavated at Mgungundlovu (Parkington & Cronin 1979). Although, at KwaMaza, there is no clear evidence for a central posthole and the fireplaces are further back than those at Mgungundlovu. The relatively small size of the floor suggests that structurally a central

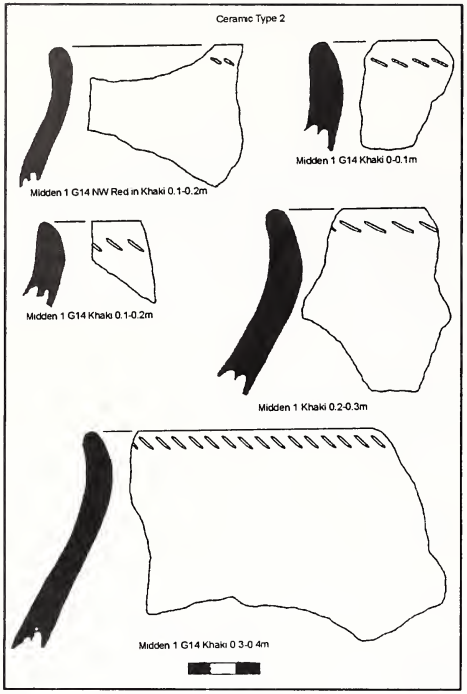
Ceramic Type 2
Midden 1 G14 NW Red in Khaki 0.1-0.2m
Midden 1 G14 Khaki 0-0.1m
Midden 1 G14 Khaki 0.1-0.2m
Midden 1 Khaki 0.2-0.3m
Midden 1 G14 Khaki 0.3-0.4m

Fig. 9. Ceramic shards from KwaMaza B.

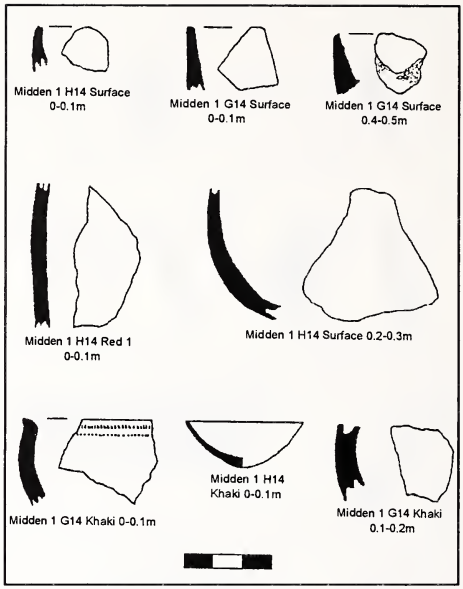

Fig. 10. 'Children's' ceramic shards from KwaMaza B.

pole was not critical, and the house could still be beehive in shape. Lastly, although it is unclear what criteria were selected, W. Mahlangu favoured a beehive structure.

It is evident that there are a number of similarities in the layout of the assembly area, the kraals and the houses, that relate to the structuring principles of left/right and front/back.

Van Vuuren (1980:41) argues that left and right are key structuring principles within present day Ndzundza settlements. The right hand side ("ubene") of the house is the male side and the left hand side ("ikhohlo") is the female side. The same left/right division applies in the "isibaya". Today the "ibandla" is always located on the "ubene" side of the "isibaya". This division also reflects status, the house of the first wife is located on the "ubene" side and the house of the second wife on the "ikhohlo" side. The "ubene" side is thus the male or higher status side, whereas the "ikhohlo" side is the female or lower status side. This left/right division is evidently applied at KwaMaza A. The paramount's 'house' built into the assembly area wall, the side entrance to the "ibandla", and the side entrances to the "isibaya", are all located on the "ubene" side.

There are also similarities in the front/back layout of the assembly areas, kraals and the house floors. The "umbundu" defines the back area of the house, and the door the front. Raum (1973:157-159) states that Zulu houses are symbolically divided into front and back. The front area is more public, whilst the back area is used for storing important items, certain food such as beer and ritual items like the ancestral spear, the stabbing spear and ritual robes. It is also a ritual site and is associated with the ancestors. Kuper (1982:148) argues that this front/back division is common amongst Nguni-speaking groups. He (1982:147) states that back area of Nguni houses are sacred, and associated with the ancestors, whereas the front area is 'public'. Raum (1973:159), however, challenges the perception of the "umbundu" as immanently sacred, and states that the avoidance of this area is rather related to the fact that ritual objects are stored here and that it is "visited by or belongs to the ancestors" (Raum 1973:159). The front/back division also applies to the kraals and assembly areas, the back is defined by the lower lobe and the front by the upslope entrances. There are, therefore, conceptual similarities in the layout of the assembly area/court, the kraals and the houses. These similarities are the product of the "ubene"/"ikhohlo", and front/back symbolic divisions.

The position and structure of the middens at KwaMaza A and B also needs some discussion at this stage. At KwaMaza A, Homestead 2 middens are situated below the kraal and house-terraces, as is the case at Homestead 3. At KwaMaza B the middens are also located below the house-terraces and adjacent to or below the kraal. Six of the middens/mounds have formed over stone walling. The position of the middens can be interpreted through the Nguni ethnography that records

a number of avoidances and rules regarding the handling of ash. Ash is handled by women (except new brides), and strangers should not tamper with the ash of a household, since it is believed that the ash could be used in maleficent magic against the owner of a homestead (Raum 1973:145-146). Ash heaps are, therefore, located in front of the homestead, so that they can be constantly observed. The relatively dense clustering and location of the ash heaps at KwaMaza A and B could express this concern over the protection of ash middens through their surveillance.

Furthermore, the culturally sterile red soil layers could indicate the intentional capping of ash in order to protect the household against the use of ash in malevolent magic (Schoeman 1995). Whilst, I interpret these red layers as the purposeful capping of middens in order to protect them, it could be argued that the red soil layers were simply the spoil heaps from digging and constructing the house-terraces. These two suggestions are not mutually exclusive. If the soil originally came from the excavation of the terraces, it would have acquired social meaning through being incorporated in middens. However, it is interesting to note that at KwaMaza B, where excavation and terracing was more comprehensive, the middens are not as extensively capped.

It appears that the capping of ash is a good indicator of people with a worldview that originated in the Nguni areas of KwaZulu-Natal. Similar examples of capping are found in the Ndebele sites excavated by Loubser (1994) and Huffman and Steele (1996). This is in sharp contrast to the Sotho world. As far as I can establish, there are no examples of this way of disposing of ash in Sotho sites, and the practice is, therefore, peculiarly Ndebele.

Another aspect of the KwaMaza A and B middens is their relatively large size. This may indicate not only a long occupation, but symbolically reflects the high status and wealth of the immediate occupants. It is noticeable that the middens in the rest of the settlement below KwaMaza A and B are low and ephemeral by comparison.

In spite of their large size there are, however, two key differences between the middens at KwaMaza A and B. Firstly, the capping at KwaMaza A is more extensive than that of KwaMaza B. The surfaces of KwaMaza A middens are covered in thick red soil caps and stony rubble, whereas, the KwaMaza B ash layers are intermittently capped by either stone or red soil, and the surfaces of some middens have not been covered at all. Second, the KwaMaza A middens contain less ash than the middens at KwaMaza B. This is apparent from excavations and also indicated through the extensive burrowing of the KwaMaza B middens, where thick ash has attracted numerous rodents. In contrast, the KwaMaza A middens are hardly burrowed and Middens 2, 3 and 5 have not been burrowed at all. This may relate to significantly less ash in the KwaMaza A middens, and also indicate that the capping layers are considerably thicker, and were more frequently laid down in comparison to the KwaMaza B middens. In other words, this difference possibly indicates a greater concern at KwaMaza A to protect ash.

In contrast to the 'independent' identity expressed in the settlement pattern, housefloors and middens, the type of ceramic decoration found at KwaMaza A and B is similar to historic Pedi ceramics. Traditional Pedi decoration consists of a band of decoration on the rim and a series of arcades or chevrons on the shoulder associated with graphite and ochre (Laidler 1932; Lawton 1967; Collett 1982). The Ndzundza Ndebele are not recorded to have had a ceramic tradition of their own in the twentieth century (Lawton 1967). The reason for this can probably be found in the effects of the 1883 dispersal. Today they obtain their pots from their Pedi neighbours and have done so for at least the last seventy years (W. Mahlangu, pers. comm.). The evidence from KwaMaza indicates that from the seventeenth century, the Ndzundza occupants also used 'Pedi' style ceramics. The occupation at KwaMaza clearly does not give any indication of how, or when, the Ndzundza adopted this style. The 'children's ceramics' at KwaMaza B, however, suggests that they did make their own ceramics, and that the 'Pedi' decoration (at least Type 2) formed part of the stylistic consciousness of young people from an early age.

CONCLUSION

Different identities are expressed in the different material culture categories from KwaMaza: settlement pattern, house form, midden structure and ceramic style. The settlement pattern and houseform express a more 'Nguni' identity, the middens express a particular 'Ndebeleness' and the ceramics are 'Pedi', thus reflecting a more regional identity. The range of identities expressed in the different types of material culture, highlights the importance of examining all types of material culture when studying identity in the Late Iron Age.

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and conclusions arrived at, are those of the author and are not necessarily to be attributed to the Centre for Science Development.

ENDNOTES

1. The leader of the Sokhulumi section of the Ndzundza Ndebele and Ndzundza oral historian.

2. Left and right refer to the direction when facing into the entrance of a structure.

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REPORT ON ISOLATED HUMAN REMAINS FROM K2, SOUTH AFRICA*

M. STEYN

Department of Anatomy, University of Pretoria, P.O. Box 2034, Pretoria, 0001.

A. MEYER

Department of Anthropology and Archaeology, University of Pretoria, Pretoria, 0001.

and

M. LOOTS

Department of Anatomy, University of Pretoria, P.O. Box 2034, Pretoria, 0001.

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ABSTRACT

The skeletal collection from the Mapungubwe complex of Iron Age sites is the largest of its kind in southern Africa. During recent excavations, the partial remains of at least three more individuals were unearthed in the main midden of K2. These comprised of cranial remains, and included a near complete cranium, a complete mandible, a fragmentary mandible and several broken teeth. There were no signs of a formal grave in the excavated area. Although normal taphonomic factors seem to be the most likely explanation for the discovery of partial skeletons, other factors such as rituals and warfare should be considered.

INTRODUCTION

The Mapungubwe complex of sites (AD 1000-1300), of which K2 forms a part, has been the focus of several studies involving human skeletons (*e.g.* Galloway 1937, 1959; Rightmire 1970; De Villiers 1979; Steyn 1994). At least 107 skeletons from K2 and Mapungubwe have already been unearthed during the several field work sessions since the 1930's (Steyn 1994). K2 skeletons have mostly been discovered in the midden which forms the central part of the site (Gardner 1963) (Fig. 1). Most of these were formal burials associated with broken pots, beads, and other items. When these were mapped, according to age and sex, no clear pattern emerged to indicate whether persons of a certain age or sex were buried in any specific area of the site (Steyn 1994).

During excavations conducted in 1995 on the main midden at K2, where it had apparently overflowed the previously existing cattle kraal (Fig. 1), cranial remains of at least two more individuals were discovered. These were, however, not formal burials, but were scattered in between the rest of the refuse found in the midden. The remains comprised of two mandibles and a cranium.

THE CRANIUM

The cranium (UP30) was found, upside down, in a dense animal bone concentration right next to a living floor (Fig. 2). It was about 10 cm. beneath the surface, in an apparently undisturbed deposit. Animal remains were mostly that of domesticated stock, mixed with potsherds and beads commonly found in the K2 midden. There were some disturbances, probably caused by burrowing animals, in the 2 x 2 m square that was dug, but careful excavations revealed these not to be in the vicinity of the skull.

The cranium is relatively complete, although the skull base and occipital bone are fragmented (Fig. 3). Its general morphology is that of a female individual, with small mastoid processes, a vertical forehead, absence of supercilliary eminences and sharp superior orbital margins (Buikstra & Ubelaker 1994). The shape of the skull (cranial index 70.1) and nose (nasal index 61.8), as well as the degree of subnasal prognathism indicate an individual of South African Negroid origin (De Villiers 1968). Skull measurements and non-metric observations that were possible are shown in Tables 1 and 2.

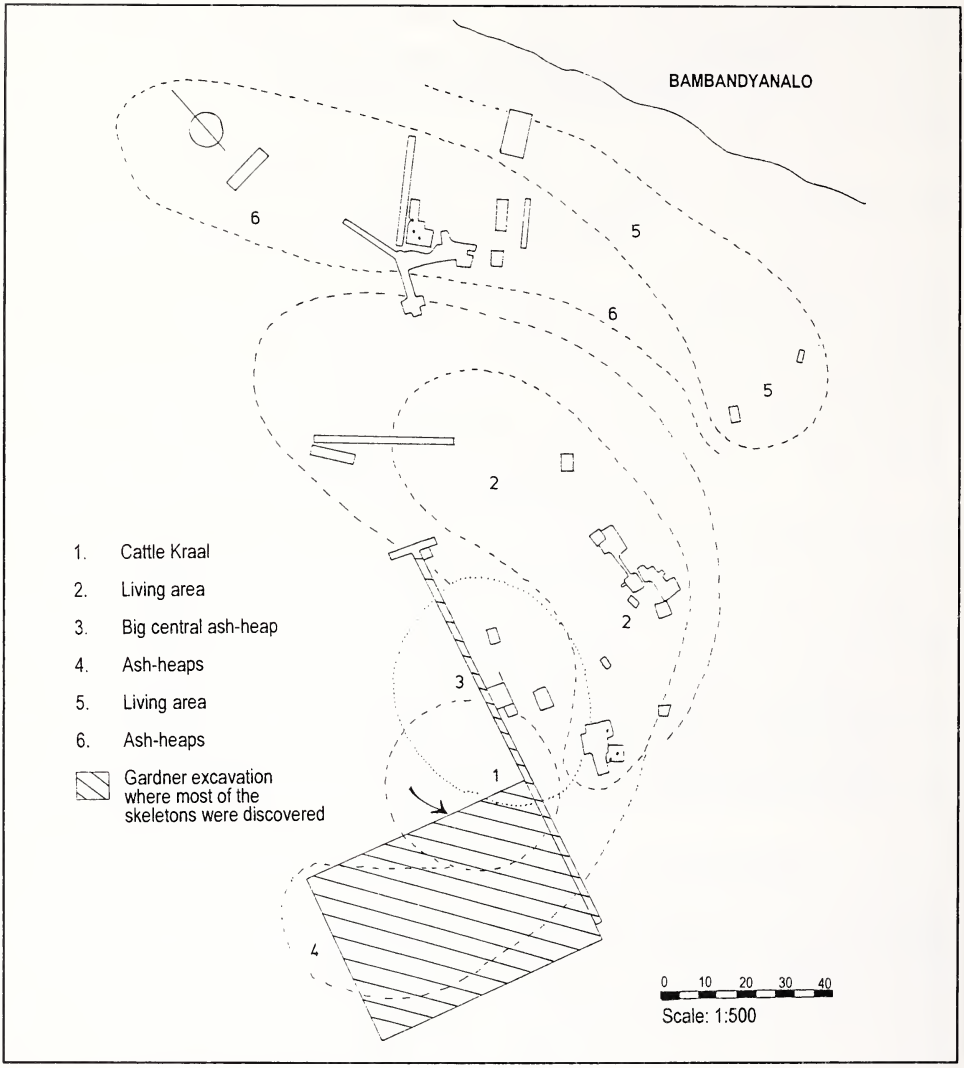

Fig. 1. Map of K2, with position of isolated human remains indicated (arrow). Original map taken from Eloff (1979).

Age determination is very difficult due to the absence of all post-cranial bones and incomplete teeth. All cranial sutures are, however, open and the few occlusal areas still present on the teeth are not too severely worn. This would indicate an age of about 30-50 years (Krogman & Iscan 1986).

The left zygoma is fractured, and the posterior part of the remaining bone gives the impression of a cut or hack injury (Fig. 4). The outer table of the bone is destroyed, and the remaining surface has striations, all running in the same direction. This surface was further investigated by means of scanning electron microscopy (SEM). A negative imprint of the bony surface was first made using Wacker silicone. From this a positive imprint was casted with Elastocil 1470 Araldite resin. The posterior part of the fractured zygomatic surface appeared rather smooth, with the anterior area more pitted, resembling the normal structure of bone (Fig. 5). Several experienced researchers at the Transvaal Museum were consulted, but all believed that the fracture was not due to gnawing

Table 1. Measurements of skull UP30 (in mm).

Maximum cranial length (L)	±184,0
Maximum cranial breadth (B)	129,0
Least frontal breadth (B^1)	97,5
Horizontal perimeter (U)	505,0
Transverse arc (Q)	284,0
Frontal sagittal arc (S_1)	128,0
Parietal sagittal arc (S_2)	122,0
Frontal sagittal chord (S^1_1)	109,0
Parietal sagittal chord (S^1_2)	110,0
Upper facial height (G^1)	65,2
Bimaxillary breadth (GB)	99,0
Inter-orbital breadth (DC)	24,8
Orbital breadth (O_1)	39,4
Orbital height (O_2)	34,0
Nasal height (NH)	45,5
Nasal breadth (NB)	28,1
Maxillo-alveolar breadth (M61)	60,0
Palatal breadth (G^1_2)	38,1

Table 2. Non-metrical observations of UP30.

Metopism	none
Glabellar prominence	flat
Supercilliary eminences	absent
Ophryonic groove	absent
Sutures at pterion	H (rightside, no left
Horizontal parietal suture	absent
Inferior frontal eminence	bilateral, small
Mons temporosphenoidales	absent right (no left)
Post. root zygoma	delicate
Tympanic plate	moderate
Mastoid process	small
Supra-asterionic region	slight flattening
Cranial form	ovoid
Wormian bones	one at lambda
Post-coronal region	rounded
Interparietal region	slight grooving
Parietal foramina	absent
Zygomatic arch	phaenozygous
Foramen of Huschke	none
Shape of orbits	rectangular
Supra-orbital foramina	one right, left notch
Infra-orbital foramina	one right, (no left)
Position of nasion	superficial
Os japonicum	absent right (no left)
Torus palatinus	absent
Torus maxillaris	absent

animals. They were not, however, sure that it resulted from a cut or hack injury either. The possibility of natural breakage should thus strongly be considered.

MANDIBULAE

The first mandible is complete (UP31), and was probably that of a male individual, since it is very robust with inverted gonial angles and a square chin (Ferembach *et al.* 1980) (Fig. 6). The full set of permanent teeth had erupted, but tooth wear is slight indicating an age of about 25-35 years (Ferembach *et al.* 1980). It clearly does not belong to the skull UP30. Two complete and three broken molars are present, and there were no ante-mortem tooth losses. This mandible was also found in an inverted position about 90 cm from the skull, on the same level and at the outer edge of the bone concentration. Measurements for this mandible can be found in Table 3. Molar tooth measurements fall within the ranges of those from other K2 individuals, with the exception of the mesiodistal diameter of the third molar which is larger. This diameter is closer to that seen in the Mapungubwe individuals, although it should be kept in mind that the sample size is small (Steyn 1994).

Table 3. Measurements of mandible UP31 (in mm).

Max. condylar length (cyl)	23,9
Projective height left coronoid (crh)	66,5
Projective height left ramus (rl)	62,0
Min. ant-post width of left ramus (rb^1)	39,2
Projective length corpus (cpl)	94,5
Projective height corpus (m_2h)	29,7
Symphysial height (h_1)	33,2
Maximum bicondylar breadth (w_1)	117,5
Bicoronial breadth (crcr)	97,2
Bigonial breadth	97,7
Min. chord between mental foramina (zz)	50,5
Mandibular angle	105,5O°
Max. projective length of mandible (ml)	108,0

The second mandible (UP32) was discovered in the adjacent square, and is very fragmentary. It consists of a partial left mandibular ramus, with a few broken tooth roots. In the close vicinity at least three more fragmentary and one complete molar were discovered. These could not be positively linked to either of the mandibles.

DISCUSSION

Researchers from various sites have noted the presence of isolated human bones, for example in pots at Broederstroom (Mason 1986), or mixed with other deposits, *e.g.* at Wosi, (Van Schalkwyk 1994). Scattered human skeletal elements have previously been found at Greefswald/K2 from time to time. Gardner (1963:16) reported an isolated mandible discovered by Van Tonder in a test trench on K1. He also commented on the "lack of ceremonial burial of many of the skeletons" which he attributed to either warfare or reinterment. In his grave lists he often stated that there are "many bones missing", but it is impossible to say if this was the result of normal decay, post-depositional disturbances or poor excavation techniques.

Another incomplete burial, most probably the result of ritual behaviour, came from an overhanging rock close to K1 (Steyn 1995). Here an articulated skull, mandible and upper three cervical vertebrae were found in an upturned pot.

Fig. 2. Skull (1) in bone concentration, next to living area (4).

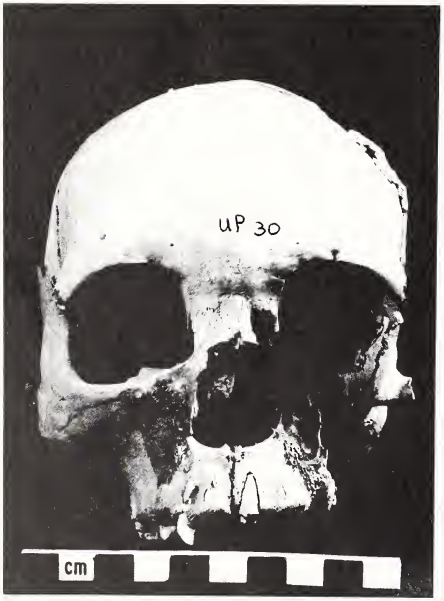

Fig. 3a. The skull (UP30) in anterior and right lateral view.

The most obvious explanation for the discovery of incomplete human remains is that the deposits had been disturbed by scavenging animals, but it seems curious that most of these finds, and particularly this find, comprised only cranial remains. Taphonomic studies have shown that cranial remains, and especially mandibles, are more often preserved than post cranial ones (Brain 1967, 1969, 1995). Brain studied the survival of goat bones found that any disproportions in the preservation of bones resulted from differential robusticity. Scavenging animals also seem to prefer feeding on the postcranials. It was found that when leopards feed on hyraxes, its body disappeared completely except for the skull which tended to have the occiput chewn away. The possibility that the disproportionate number of cranial remains found during the recent excavations resulted from normal taphonomic factors, should therefore strongly be considered. On the other hand it should be kept in mind that the K2 area was probably intensively occupied during that time period, and it is doubtful whether wild animals would come into an inhabited area. Since detailed excavations revealed no signs of later distur-bances, any scavenging on the remains would have had to take place shortly after the death of the individuals.

An investigation of situations where normal burials were not conducted, such as warfare, cannibalism, rituals or epidemics, needs to be undertaken. Although it is difficult to compare an Iron Age site with a MSA site, human skeletal remains from Klasies River also showed a "paucity of non-cranial" remains (Deacon 1995:127), and it has been suggested that the scratches on the frontal bone of one of the individuals may have been the result of cannibalism (White 1987). The Klasies River skeletal remains include about a dozen fragments of cranial vault, and only two post cranial pieces. Most of the remains are fragmentary, and some show evidence of burning and possible cutmarks. They were, like the reported remains from K2, also found in association with discarded food waste. According to Deacon the distinction between ritualism and cannibalism is not clear, and there might have been a component of both. Cannibalism seems unlikely in this context, and no cutmarks could be seen on any of the human bones from K2.

The reason for the differential preservation of cranial elements at K2 is therefore not clear at all, and only further excavation at this and other sites could help resolve this issue.

Fig. 3b. The skull (UP30) in right lateral view.

Fig. 4. Posterior part of the zygoma of UP30, showing a possible injury

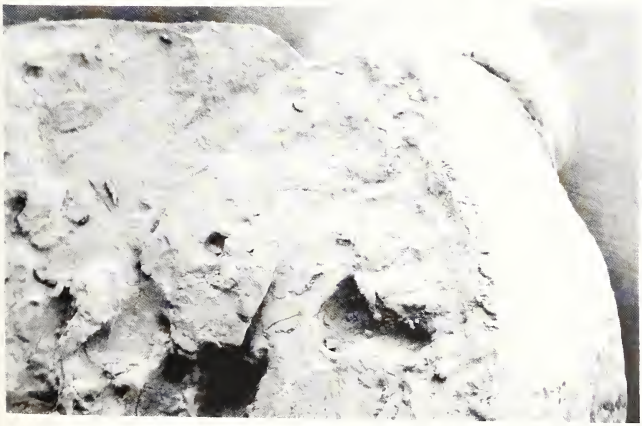

Fig. 5. Scanning electron micrograph of zygomatic surface of P30.

Fig. 6. Mandible UP31.

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Southern African Field Archaeology 7:59-60. 1998.

BOOK REVIEW: A REPLY

THE TSODILO JEWELLERY: METAL WORK FROM NORTHERN BOTSWANA. REVIEWED BY A. KOUSARIS. A REPLY.

DUNCAN MILLER

University of Cape Town, Archaeology Materials Laboratory,
Department of Archaeology, University of Cape Town,
Rondebosch 7701, Cape Town

email: dmiller@beattie.uct.ac.za

I wish to thank the editors for printing A. Kousaris's review of the book The Tsodilo Jewellery which made some very useful criticisms and highlighted some inadequacies. It shows that neither authors, nor reviewers and editors can be too careful! I would like to deal with several points in the review, which if they went unclarified might leave your readers with some misapprehensions.

1. The full title of the book is "The Tsodilo Jewellery: metal work from northern Botswana", not " ... Northern Province" [1].

2. It is difficult to work out quite what went wrong with the sentence "The author states on numerous occasions that the carbon content of near non-metallic inclusions in different ways (*cf.* pp. 54, 58, 59)", but presumably it refers to the fact that the iron in the vicinity of both oxide and slag inclusions tended to be depleted in carbon, which is not mysterious. As stated in various places in the book, this was due to diffusion of the carbon from metal to the slag or included oxide. This presumably took place while the metal was hot, and Kousaris's proposed mechanism of ongoing reduction of slag inclusions is no doubt true in some cases. Nevertheless, in other instances this decarburisation may represent an externally decarburised layer formed during forging in an oxidising atmosphere, and subsequently trapped in the metal with a layer of oxide scale during poor quality welding or folding over to thicken a section (as in the example on p. 54). Of course, diffusion of carbon could also have taken place towards the included secondary oxide during further hot forging.

3. Kousaris is correct that glass does not "transform". A more appropriate term would have been "glass transition temperature", a broad range of temperature over which the behaviour changes from predominantly plastic to brittle. This is indeed dependent on composition, as stated in the book (*eg.* p. 87) but for simple silicate glasses it is in the range 500 ^{0}C to 700 ^{0}C according to standard references (also cited). One doesn't have to resort to such technicalities to appreciate the point that some working took place at high temperature when the glass was plastic, and some at lower temperature when it experienced brittle fracture.

4. Bloomery iron smelting takes place under conditions far from thermodynamic equilibrium, which inhibits the usefulness of equilibrium phase diagrams in the interpretation of these archaeological slags. For this reason it was stated in the book that "They were obviously not equilibrium structures because of their inhomogeneity and the localised KEVEX analyses were not representative of their bulk compositions. Therefore it was not possible to relate their compositions to the relevant phase diagrams to obtain estimates of the temperature of the smelting or smithing process from these slags." (p. 82).

   From a purely materials analysis point of view, it would have been possible (and enjoyable) to have reconstructed in more detail the thermodynamic history of each nodule, but this would not necessarily represent the overall conditions operating in the smelting furnace or forge. One simply cannot reconstruct a smelting technology from half a dozen pieces of very inhomogeneous slag. From the point of view of assessing the metal working behaviour archaeologically, what was meaningful was to try to distinguish smithing from smelting slags. The distinction between what is technically analytically possible, and what analyses might be archaeologically meaningful, is an important one to make in archaeometry.

5. Kousaris is quite correct that the fine wüstite particles in regular arrays in the larger fayalite crystals are eutectic structures, and should not be described as

"exsolved" because both the fine wüstite and the fayalite crystallised together from solution in a residual melt. As far as its former molten state is concerned, this example was described in the book as a "smelting slag" (p. 61) which in the context of bloomery iron production implies that it was liquid and crystallised from above about 1400 °C. A fairly comprehensive glossary was included, which defined slag as "The molten, or solidified, waste product of smelting..." (pp. 99-101).

6. Perhaps I should also have elaborated on the implications of the observation that some specimens contained what appeared to be fused silica, in the absence of evidence for cast iron. The physical implication was that locally at least conditions must have exceeded 1723°C. This is possible in a bloomery furnace. Droplets of molten iron may well form in a bloomery furnace, and subsequently be decarburised in situ to contribute to a medium to low carbon bloom, incorporating any fused silica inclusions in the process. There is now a considerable literature recording the variability of bloomery furnace operation, internal mechanisms, and products. Any reconstructions must take this intrinsic variability into account.

7. The nodule containing martensite (p. 68) was probably a primary bloomery nodule. Its constituent martensite was described as "the product of very rapid cooling usually associated with quenching" (emphasis added) (p. 68). It is possible that the nodule cooled (rapidly) in air, as Koursaris has remarked. I also observed "How the nodule came to be quenched from a temperature above 900 °C could not be determined from the analysis, but the quenching of hot blooms with water has been recorded ethnographically elsewhere in Africa (reference given) (p. 69)." The quenching of blooms is simply to cool them quickly so that they can be handled. There was no suggestion of deliberate fast cooling to produce martensite or harden the material intentionally. On the contrary, this nodule had been discarded, possibly because it was too hard to forge easily.

8. Two of Kousaris's points I find very interesting. The technical literature records that the spheroidisation of pearlite necessitates very prolonged annealing. In many instances the spheroidised material retained a Widmanstätten structure or consisted of equiaxed ferrite with a dispersion of spheroidised cementite. If these microstructures can be produced in a matter of minutes while hot working during the formation of pearlite, experimental evidence of this would have important implications for archaeometallurgical reconstructions. The technical literature also records explicitly that characteristic narrow, parallel, twin lamellae in annealed copper are diagnostic of prior cold working. Obviously, hot working without prior cold work also involves recrystallisation, but if it produces the supposedly characteristic annealing twins then I (and other archaeometallurgists) would like to see experimental evidence of it. These two points highlight the major inadequacy of forensic archaeometallurgical interpretations, and that is the lack of experimental verification of the reconstruction of the supposed sequence of fabrication. This is a real criticism that I am very willing to level at my own work.

9. Indigenous smiths appear not to have practised a standardised set of techniques of hot and cold working as would be recognised by modern metallurgists and this makes the precise application of modern terminology problematic. Any meaningful interpretation of an assemblage of microstructures necessarily must take a broad view. Even the applicability of modern technical terms like annealing and quenching are brought into question by smithing at temperatures ranging from 900 °C to room temperature with no standardised final heat treatment, using the inhomogeneous product of a bloomery furnace which can range from nearly pure iron to nodules of high carbon steel and even cast iron. Very diverse microstructures can result, without implying any conscious change in metal working strategy on the part of the smith. Archaeometallurgists have to attempt to interpret these microstructures against an inadequate body of comparative experimental examples simply because these days realistically inhomogeneous material is very difficult to obtain for experimental verification.

10. Finally, one minor point. Rusty bits of metal look like rusty bits of metal when they are photographed. The sketches were drawn by a technically trained artist to enhance structural features that otherwise would have been obscure. They actually cost less than professional photography would, and are far more informative.

EDITORS NOTE

1. The manuscript was re-typed from a hard copy to disk. The typist by mistake typed "... Northern Province" instead of "... Northern Botswana" and it was not detected during the final editing. **The Editors would like to express their sincere apologies to Prof A. Kousaris and Dr Duncan Miller for any inconveniences this may have caused.**

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Southern African Field Archaeology: ambj@warthog.ru.ac.za
Johan Binneman: amjb@giraffe.ru.ac.za
Lita Webley: amlw@warthog.ru.ac.za
Alex Schoeman: amms@warthog.ru.ac.za

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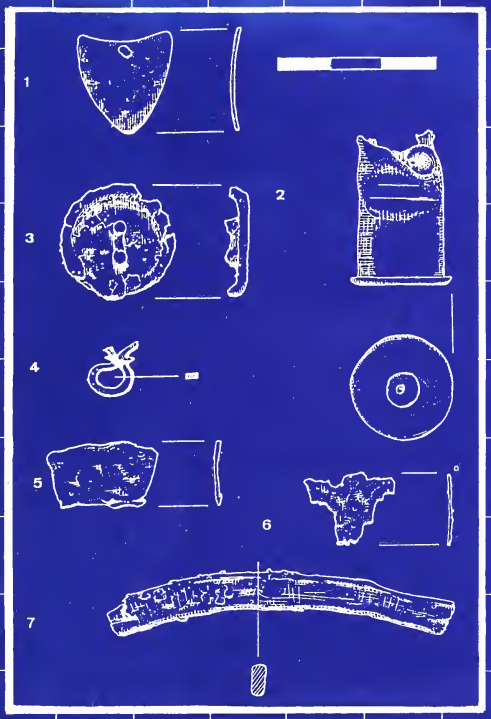

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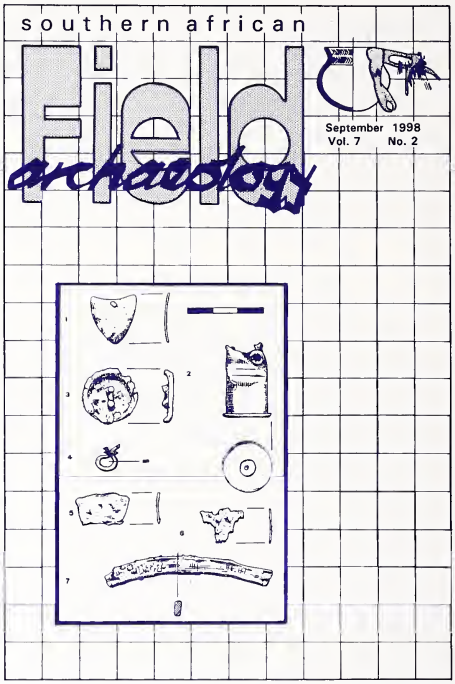

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SUNSHINE, BRAAIVLEIS, RUGBY, CHEVROLET AND ARCHAEOLOGY: Should children dig and the public record rock art?

About two years ago the Boy Scouts of America introduced an Archaeology merit badge. "The purpose of this badge is to help scouts to understand the archaeological process and to recognize that prehistory and historic resources are fragile remains that need careful study and protection for the future" (Skinner 1977:17).

During the past few years public archaeology and public outreach programmes have become important to advertise archaeology to the wider public. However, different interpretations of what outreach is, and how it must be implemented, may become a major issue in the future. To some it simply means taking children on a dig and members of the public to a rock art site and showing them how to do tracings. After all, it may be argued, what is archaeology other than digging and tracing?

Should children, or untrained people dig? Is it ethically acceptable? Consider the following: A honours degree is

required to be employed as a professional archaeologist. During this period we learn the basic excavation techniques, analysis and publication of data. To do research requiring excavations, we need a permit from, and report to the National Monuments Council (NMC). In certain cases, where the NMC is of the opinion that an applicant is not experienced enough to conduct an excavation on her/his own, it is issued to a supervisor.

Now, after years of study, bombardment and exposure to the importance, ethics and morals of archaeological resources and the responsibilities of heritage management, we allow a group of untrained school kids to dig archaeological sites, because we think that is the way public archaeology is supposed to happen.

Let's return to the Boy Scouts merit badge requirements for a moment.

> The requirements will expose boys, their leaders and parents to a wide variety of archaeological subjects without attempting to turn boys into professional archaeologists. Through the influence of scouts and those associated with the scouting programme, a major segment of the general public will gain a new appreciation of archaeology, and many people will become advocates for responsible heritage management.
>
> The badge requirements are a blend of introductory archaeology and cultural resource preservation. Active involvement in a mock dig, an excavation, or in lab work is included, **but not until after the scout understands the archaeological process and how sites are dated, and has collected information about known sites**" (my emphasis) (Skinner 1997:17).

Thus, only after theoretical training the scouts may do a mock dig or an excavation. Notwithstanding, as professional archaeologists are we not violating the conditions of the permit, issued on the researcher's experience, and so become accomplices to the destruction of precious protected archaeological material by untrained people?

Should the public be introduced to tracing rock art? The arguments are similar to the above, except that no permits are required for rock art tracings. I will return to this point later. Can you imagine how much pressure we are placing on the precious art by encouraging, and showing every Dick, Tom and Mary to spend their Sunday afternoons tracing rock art? Who will take the responsibility when art is damaged by the public who were introduced to tracing by us?

Any professional archaeologist involved in the study and tracing of rock art, will tell you how complicated it is. Special skills are required to 'read' the context of paintings and make accurate tracings. These skills are not acquired on a lazy Sunday afternoon scribbling on plastic with a koki, they come with years of studying paintings and reading the literature to understand what the art means.

The immediate response to the above may be two fold. Firstly, that the public has the **right** to rock art. BUT, do they have **rights** or only **privileges** to heritage resources? AND if these **rights** and/or **privileges** are violated, should they be taken away? Archaeologists do not have a **right** to excavate sites, it is a **privilege**. Secondly, the concept/idea of **sacrificing** sites - is this an ethically acceptable or a vulgar concept? As so called watch dogs and managers of heritage resources are we allowed even to consider **sacrificing** precious cultural material to be destroyed? By **sacrificing** are we not accomplices to a crime. If we as archaeologists or archaeological resource managers, are incapable of protecting sites and preserving the cultural heritage should we practice public archaeology?

Van Gogh produced several paintings (some 14) of his famous sunflowers in a vase to decorated his living area. Does this mean that we must **sacrifice** one of these precious paintings because there are a couple of these, by placing it in Times Square or Travalgar Square for the public to copy just because they have a **right** to Van Gogh? Each of these paintings are unique, so are each and every individual painting and each rock art panel.

Why do the public need to, or want to trace rock art, for what purpose? What will they do with their precious scribbling on plastic of a 'funny human with an animal body feeding grass to an eland'?

An aspect which needs urgent attention is a management policy regarding the proper protection of rock art - especially now that the public is taught how to trace the art. With the ever increasing pressure on rock art we must consider the following:

1. Tracing of rock art should require a permit, similar to that for excavating. This is the only way NMC and the local Data Recording Centres (DRC's) will be able to monitor the traffic on paintings and the possible damage. In this regard the KwaZulu-Natal Heritage Act of 1997 set an excellent example (see Act No, 10 of 1997).

2. All landowners who exploit rock art for financial benefits (usually to advertise bed and breakfast and/or hiking trails) should register either with NMC or the local DRC or both and comply to certain management policies.

Virtually without exception these entrepreneurs are not even aware that the art is protected by law. These people should be responsible for the protection and management of the art - landowners are only the custodians of the art, which belongs to the nation (see also Ouzman 1996).

Furthermore, these people should contribute a percentage of the financial benefits which they gain from the art to a central fund for the study of rock art.

Remember the TV advert, South Africa is the land of sunshine, rugby, braaivleis and chevrolet, will rock art recording become the fifth most popular weekend past time? Only time will tell.

Johan Binneman
Department of Archaeology
Albany Museum
Grahamstown

Southern African Field Archaeology 7:63-71. 1998.

THE ARCHAEOLOGY AND SYMBOLIC DIMENSIONS OF A THIRTEENTH CENTURY VILLAGE IN EASTERN BOTSWANA*

J. KINAHAN, J.H.A. KINAHAN

Department of Archaeology, Uppsala University, St Erikstorg 5, S75310, Uppsala, Sweden

Correspondence to: Quaternary Research Services, P.O. Box 22407, Windhoek, Namibia

and

C. VAN WAARDEN

Marope Research, P.O. Box 910, Francistown, Botswana

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ABSTRACT

Excavation results from a 13th century AD site in eastern Botswana confirm that the symbolic dimensions of southern Bantu settlement organization are archaeologically visible at the village level. The influence of this spatial patterning is illustrated by the archaeology of the major site components and the structured distribution of features, artefacts and refuse disposal within the site.

INTRODUCTION

Eastern Botswana, between the Limpopo and Shashe Rivers, is not as well known archaeologically as the adjacent parts of Zimbabwe and South Africa. On present evidence, it is believed that the agricultural occupation of this region in the first millennium AD was followed some hundreds of years later by a northward movement from the lowveld of South Africa, bringing across the Limpopo and into Zimbabwe a sequence of cultural developments which lead to the eventual rise of the Shona state (Huffman 1984).

Although this expansion is marked by the rise of long distance trade and wealth in cattle, most sites represent small mixed farming communities with indications of wider contacts limited to a few glass trade beads. The available evidence is of semi-permanent homesteads and villages with grainbin supports, storage pits, grindstones and iron hoe blades, the sites exhibiting a common preference for arable soils, with ample supplies of wood and in close proximity to reliable water (*cf.* Hanisch 1980). The characteristic accumulations of dung on these sites were once mistaken for middens, owing to the presence of bone and ceramics in an ashy matrix, but now it is apparent that they are the remains of cattle pens (Butterworth 1979; Denbow 1979; Huffman 1984).

Huffman (1984, 1986) considers the archaeological evidence to be consistent with the Southern Bantu settlement pattern described by Kuper (1980) which incorporates a central relationship between cattle and the living community and the spirit world. In this system, cattle are an integral part of the nexus of power and therefore belong to the domain of men. The men's assembly area and court is located near the cattle pen and men are buried in the pen itself. Raised grainbins are located behind huts which are arranged around the cattle pen. Although elements of the pattern have been found on many sites, the evidence is fragmentary and there is a paucity of archaeological examples which exhibit the complete pattern (but see van Waarden 1989a).

This paper presents the results of a detailed investigation at Bobonong Road, the site of a 13th century AD village which lay on the periphery of the Mapungubwe kingdom centred on the confluence of the Shashe and Limpopo Rivers (Fig. 1). Already disturbed to some extent by a track from the modern village of Molalatau to Mathathane, the site of Bobonong Road (National Museum site register 28-B1-9) was due to be largely destroyed by the construction of a new district road (van Waarden 1989b). Excavations at the site formed part of a mitigation study commissioned by the Roads Department of Botswana and reported in more detail elsewhere

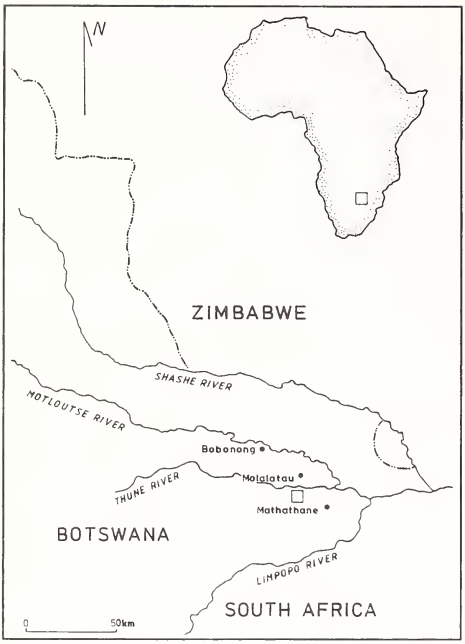

Fig. 1. The regional setting of Bobonong Road in eastern Botswana.

(Kinahan & Kinahan 1993; Hall 1993). Following a brief description of the site and its physical setting, the archaeological evidence is presented below in two sections, one dealing with the stratigraphy and dating, and a second with the description of ceramics, faunal remains and the variety of other finds which are used to place the site within a wider cultural and economic context.

APPEARANCE AND PHYSICAL SETTING

The site of Bobonong Road occupies a gentle north-facing slope on one side of a saddle between low hills in a sandstone ridge which lies about 1 km south of a deep bend in the Thune River. The surrounding landscape is broken by a number of similar outcrops, but the location of the site combines easy access to the river and to areas of relatively flat, well-drained ground suitable for cultivation. Although the site environment is typical of the eastern Kalahari hardveld as described by Thomas and Shaw (1991), few other locations in the vicinity combine all these characteristics within a relatively small area.

The Thune River, a tributary of the episodic Motloutse, is flanked by dense riparian forest with mature *Acacia* and *Combretum*. The river cuts across several bands of schist and these create large reservoirs of water which can be reached with shallow wells. Most of the surrounding area is covered by secondary *Mopane* and *Terminalia* which has developed into an open woodland suitable for keeping cattle and goats. Wild fauna in the vicinity of the site is limited to impala and steenbuck, although elephant, lion and other species still enter the area from the neighbouring Tuli Block and probably represent the range of animal life which occurred here in the past.

On the site itself, the most visible feature was an accumulation of cattle dung more than 30 m in diameter. An area up-slope of this and approximately 40 m wide was largely free of natural rubble. The presence of numerous archaeological indications within this area, including several small stone features, suggested that it had been systematically cleared. A midden of grey ashy soil about 20 m in diameter lay at the southern end of the rubble-free area which loosely defined the extent of the site. To establish in more detail the characteristics and relationships of these visible indications a series of transects were laid out across the whole extent of the site. Trenches of three 1 m^2 units were excavated at staggered intervals of 3 m over the dung accumulation and the up-slope clearing, and larger excavations were made at a number of points including the midden and other localized concentrations of ceramics. In addition, numerous shovel tests and soil samples were taken to assist in defining the limits of the site components. The positions of the trenches and the inferred limits of the cattle pen as well as the midden and the area in which the huts lay are shown in Figure 2.

STRATIGRAPHY AND DATING

Test pitting revealed that the archaeological deposits at Bobonong Road were less than one metre in depth, overlying an archaeologically sterile horizon which could be differentiated into two facies, namely hill rubble (Unit 1) and coarse red decomposed rubble (Unit 2). Systematic excavations revealed a coarse granular red sand (Unit 3) which overlay these basal units and which appeared also to be archaeologically sterile, apart from some intrusive ceramics. A grey-brown soil (Unit 4) extensively overlay Unit 3 and formed the main surface horizon in the archaeologically poor areas of the site. Elsewhere on the site, a characteristic granular pink soil (Unit 5) which may have derived from dis-aggregated daga (hut daub) wall plaster or flooring was consistently associated with high concentrations of ceramics. Also overlying Unit 3 in places was a thin but conspicuous white crust (Unit 6) which appeared to be leached from overlying dung (Unit 8). The dung deposit itself was generally unmistakeable, being greyish white in colour with a loose, block-like structure.

A smaller but similarly restricted deposit of midden ash (Unit 7) and a number of stone features (collectively Unit 9) cemented into the surface were contiguous with Unit 8. The surface horizon of the site was formed by a layer of greyish pink topsoil (Unit 10) which partly overlay Units 7 and 8. Unit 10 had clearly accumulated

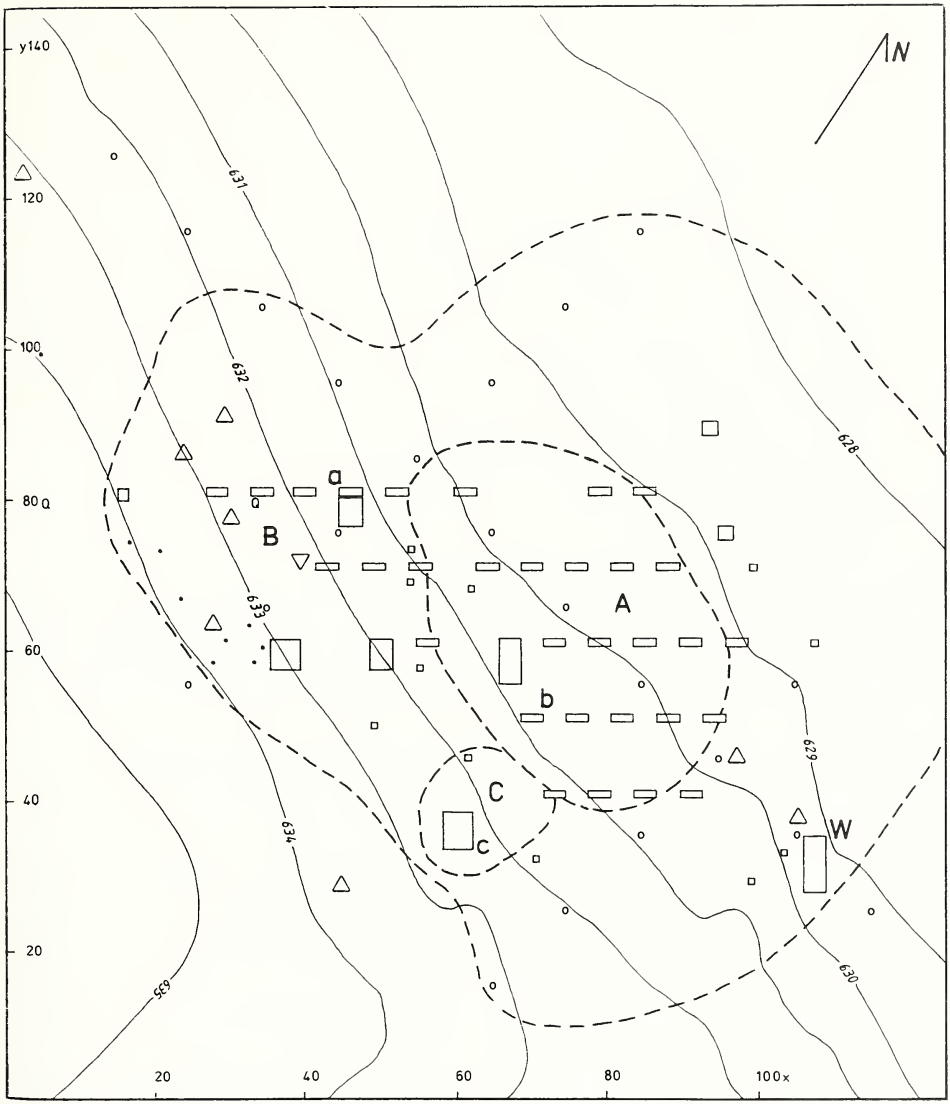

Fig. 2. Site plan and layout of excavation trenches at Bobonong Road with marginal scale is in meters. The cattle pen (A) lies within the inner circle and the outer circle marks the extent of the site clearing (B); the midden lies within the smaller circle (C) and the short length of stone walling (W) was located in the lower right trench. The inverted triangle represents the site datum point; the upright triangles represent stone features presumed to be grainbin supports; dots are stone pestles and Q is a quernstone. Open circles are soil sample points. Stratigraphic sections of the trenches marked (a), (b) and (c) are shown in Figure 3.

in the process of pedogenesis since the abandonment of the site. The occupation of the site was therefore represented by two sets of deposits, comprising both primary accumulations (Units 7, 8 and 9) and derived accumulations (Units 4, 5 and 6). These units incompletely overlay natural soil and rubble horizons present on the hillside when the site was occupied for the first time (Units 1, 2 and 3).

Several illustrative examples of stratigraphic relationships at Bobonong Road are shown in Figure 3, together

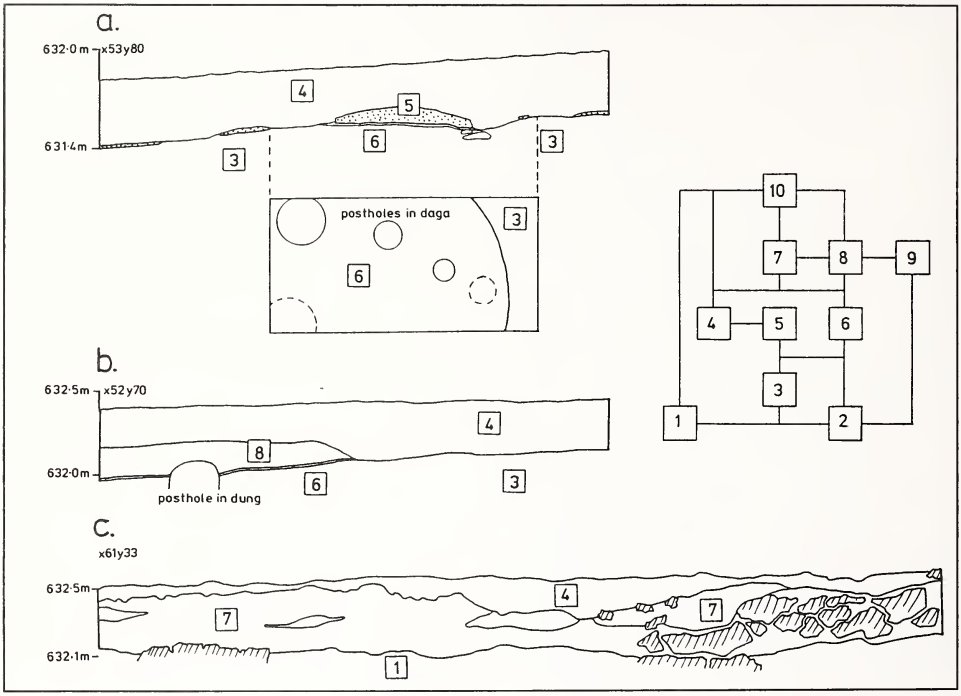

Fig. 3. Harris matrix of stratigraphic relationships at Bobonong Road, and selected stratigraphic profiles, showing (a) hut post holes in daga at x53y80; (b) cattle pen post hole in dung deposit at x52y70; and (c) main characteristics of the midden deposit, as at x61y33.

with a Harris matrix summarizing the full range of relationships observed at the site. The trench section from position x53 y80 (Fig. 3a) shows a compact mass of hut daga resting on basal sands with an interleaving white crust. This horizon probably represents the occupation surface which was subsequently covered by an homogenous layer of grey brown soil eroded from the upper slopes of the hill side. The plan view of the daga mass shows a clearly defined kerb-like edge, as well as several post holes and a moulded hollow, all features consistent with the construction of a wattle and daga hut. In most of the trenches it was not possible to identify such structures with certainty and much of the granular pink deposit would be at best only derived from dis-aggregated daga.

The section from position x52 y70 (Fig. 3b) shows the same overburden of homogenous grey brown soil as the previous example, in this case on the edge of the dung accumulation which rests on basal sands with an interleaving white crust. The section also shows a post hole which presumably belonged to the fence of the cattle pen. This suggests that upright posts were used, rather than a barrier of cut thornbush, although a combination of the two is also likely. The post hole was filled with burnt, charcoal flecked sand which indicates that the fence, if not the cattle pen itself, was burned to the ground. With the retaining fence removed, the dung spread down-slope from the cattle pen, as is shown by the interpolation of soil phosphate values in Figure 4.

The main concentration of stone features on the site lay on the up-slope side of the cattle pen. These features appear to have been mainly grainbin supports and were found in association with stone pestles made from dolerite cobbles. One small stone quern was also found among the stone features. These finds indicate that grainbins were positioned near the outer perimeter of the site. A short length of walling was found on the eastern side of the saddle, in association with ashy hearths and ceramics (Fig. 2). This suggests that there may have existed an arc of huts along the whole of the up-slope side of the site, on either side of the midden. The absence of grainbin structures from the area of the walling might be the result of modern earthmoving activity in the course of repair work on the track, or some spatial differentiation of activity on the site. On the other hand, the walling may be a part of a court or men's assembly area, isolated from the main concentration of huts clustered in the area to the north of the midden.

The midden was one of the richest archaeological

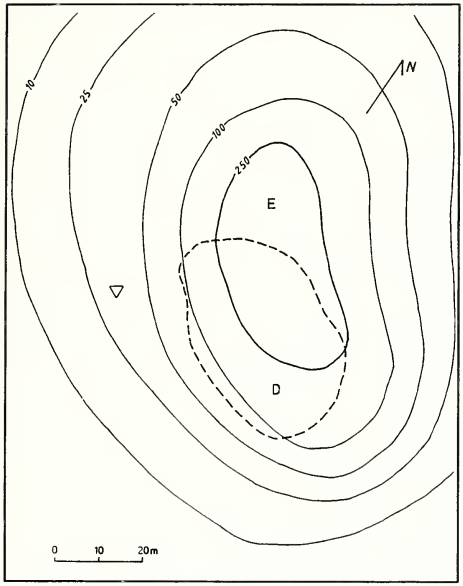

Fig. 4. Soil phosphate (mg/l PO_4^{3-}) distribution at Bobonong Road; visible dung deposit marked D and phosphate anomaly marked E, indicating position of cattle pen and down-slope leaching of dung deposit. Inverted triangle represents site datum.

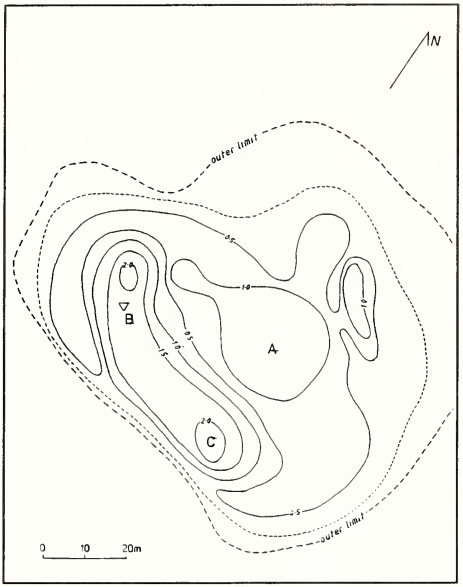

Fig. 5. Ceramic mass (kg/m³)contour model showing major site components at Bobonong Road; cattle pen marked A, hut area B, and midden C. Inverted triangle represents site datum.

features of the site and consisted of an homogenous ashy sand accumulation with minor lenses of ash and an overburden of grey brown soil (Fig. 3c). The deposit had evidently accumulated on the original surface rather than within a specially excavated pit. On the down-slope side, the midden deposit abutted the dung deposit of the cattle pen, indicating that the two had accumulated at the same time. Although the midden deposit was not easily distinguishable from the overlying grey brown soil, it contained a far higher concentration of archaeological material including ceramics, faunal remains and other finds. Since the midden was basically unstratified, and apparently coeval with the cattle pen a charcoal sample from the midden dated to 810 ± 70 BP (Beta 62740), calibrated to AD 1269 with a one sigma range of AD 1220 - AD 1291 (Talma & Vogel 1993), was taken to represent the age of the site occupation as a whole. This date places the site in the Mapungubwe phase of the Leopard's Kopje Tradition (Maggs 1984:347).

DESCRIPTION OF FINDS

Ceramic vessels were the most abundant and most generally distributed of the archaeological finds at Bobonong Road. Sherds totalling 152 kg were recovered from the site, with decorated or otherwise diagnostic sherds representing a maximum estimate of 159 vessels.

Finds from the area of the huts comprised altogether 103 vessels, as compared to the cattle pen and midden with 40 and 16 vessels respectively. This uneven distribution is clearly illustrated by the mass contour plan of the site in Figure 5 which identifies two high mass areas at the points of an arc overlooking the cattle pen. The plan shows that the main areas of residence and refuse disposal identified from the stratigraphy of the site are also defined by the distribution of ceramics. Furthermore, the fact that the cattle pen is also visible as a moderate concentration implies that if there had been huts on the eastern side of the site these would be indicated by higher concentrations of ceramics even if no daga structures were visible. The distribution of ceramics therefore confirms the stratigraphic evidence concerning the layout of the site.

From the sample of ceramics a total of 27 vessel profiles could be reconstructed and assigned to four broad shape classes. Tall necked globular pots predominated with sixteen vessels, and there were in addition eight open bowls, two constricted bowls, and a single beaker. Ten of the globular pots were recovered in the vicinity of the hut floors and related remains, while four came from the cattle pen and two from the midden. Five of the open bowls came from the hut area and three from the midden. One constricted bowl came from the cattle pen and the other from the hut area, where the beaker was also found.

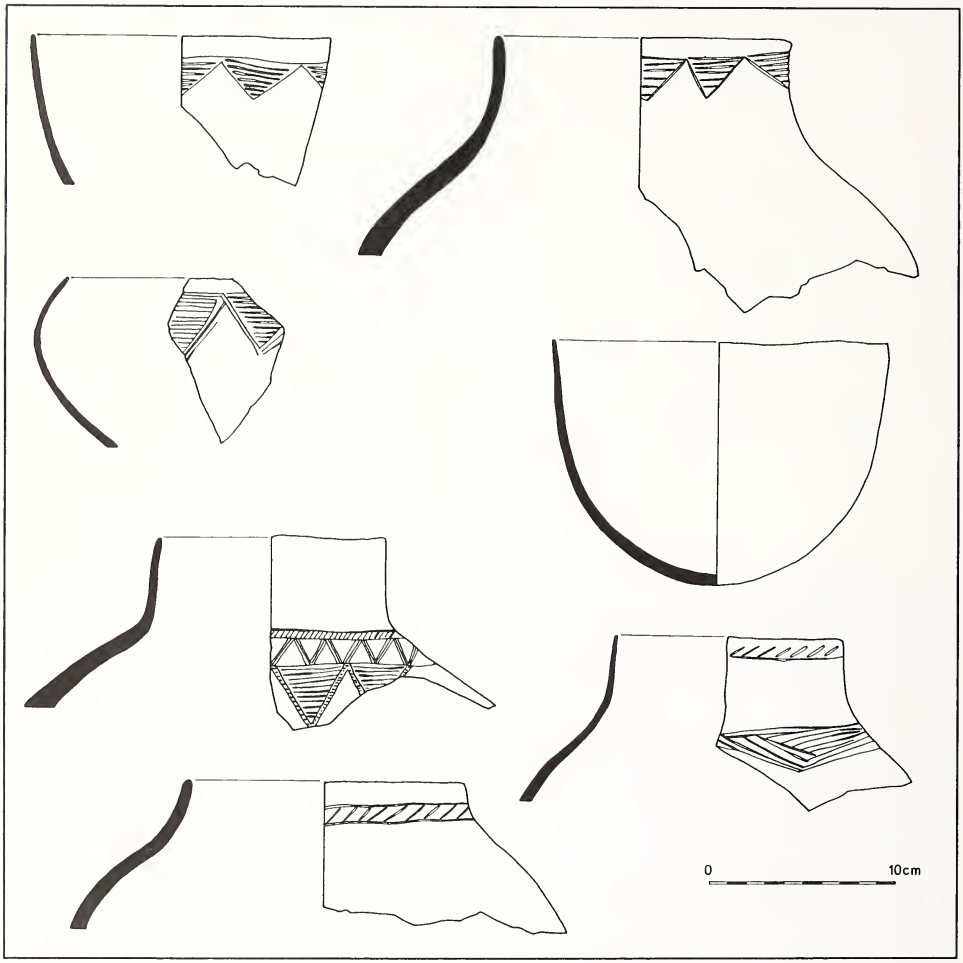

Fig. 6. The ceramic assemblage from Bobonong Road.

The reconstructed sample is biased in favour of vessels found largely complete, or those represented by sherds with textural decoration or burnishing. Sharp stylus incision was evidently the main technique of textural decoration and most decoration was placed either in or below the neck; alternatively, as a band above the main point of inflection on the constricted bowls, or as a band below the rim on the open bowls. The most common decoration motifs on the globular pots were either a band of pendant triangles filled with parallel incisions, or two parallel incisions with oblique incisions between. The triangles could be located just below the rim or in the inflection of the neck and could occur either singly, in combination, or in more elaborate, tiered repetition. Upright triangles were comparatively rare.

Figure 6 illustrates a range of ceramic vessels from Bobonong Road and shows that several of the decoration motifs found on the necked pots also occurred in the other shape classes. For example, the simple band of pendant triangles found among these pots also occurs among the constricted bowls and the open bowls. A double-incised border on pendant triangles occurs among both necked pots and open bowls, while upright triangles occur on necked pots and constricted bowls. Parallel incisions with oblique incised strokes occur among both necked pots and beakers. This distribution of motifs indicates a unity of decoration within the assemblage as a whole, although it is clear that the necked pots were the most diverse class and included the full decoration repertoire of the assemblage.

In general, the assemblage is characteristic of the Bambandyanalo phase of Leopard's Kopje which Hanisch (1980:276) has described as comprising pots with incised decoration under the rim, in the neck and on the shoulder; bowls with incision under the rim or on the shoulder; beakers with incision under the rim or at the base; and beaker bowls with incision at the base. In this sense, the Bobonong Road assemblage is similar to that of Mtanye, a Bambandyanalo assemblage described by Huffman (1984). However, although the Bobonong Road assemblage is smaller and probably for that reason lacking some of the Mtanye decoration affiliate sets, it contains some affiliate sets that are not listed by Huffman as part of the general Bambandyanalo repertoire found at Mtanye, K2 and Pont Drift. These affiliate sets include the tiered pendant triangles on necked pots and the upright cross-hatched triangles on the constricted bowls. Such differences may indicate a transitional Mapungubwe status for the Bobonong Road assemblage.

At Bobonong Road, ceramic figurines were found to be concentrated in the vicinity of the huts, particularly in those trenches where large quantities of ceramics were found. As such the figurines were associated with the huts rather than the cattle pen, where only three of the fragments were found. Three other fragments recovered from the midden therefore probably represent refuse from the huts. The fragments found at the site appear to be mainly of human rather than animal figurines, although only two were unequivocal in this respect, having buttocks in one instance and the scars of appliqué buttocks in the other. The latter example also had a slightly protuberant navel with sharp stylus decoration which probably represents cicatrized patterns on the human female body. Three other pieces having a basically spatular shape might represent the heads of these or similar figurines, one having punctate decoration. In addition, there were eight fragments of figurine legs, three showing vestigial feet. The more complete leg fragments were of similar diameter to the thighs of the pelvis fragments and might therefore belong to the same or similar figurines. From this evidence it appears that female figurines emphasized the pelvis rather than the torso, that heads and feet were reduced and arms entirely absent. This is essentially the pattern observed by Huffman (1974:64-65) at the Leopard's Kopje name site and more broadly confirmed by Matenga (1993: 89-102).

Miscellaneous small finds at Bobonong Road included metal objects and evidence of metal-working, as well as beads of shell and glass, and some worked bone. Stone objects included small grindstones or pestles, and some flaked and polished pieces. The miscellaneous finds are summarized in Table 1.

Fragments of fired clay showing traces of light glazing were recovered from the hut trenches and the midden. It was not however possible to determine whether these and other items related to metal-working represented fragments of furnace wall or tuyére, or if they were related to copper rather than iron-working. Indeed, the very small number of fragments suggested that no metal was produced on the site and that these had been brought in from elsewhere. Although small amounts of slag-like cinders would have been associated with a smithy, or forge, surface glaze on one of the fired clay fragments points to a temperature in excess of 960°C, much higher than the working temperature of a forge (*cf.* Van der Merwe 1978).

Several short lengths of spiral-wound copper were recovered from the midden, fortuitously preserved in the ashy deposit. Copper wire about 1,5 mm in diameter had been beaten flat and thin, so that the edges were quite sharp, a procedure which would have entailed some annealing to reduce the brittleness of the material. To make what was evidently a bangle, the flattened wire would have been wound over a core of grass or animal hair about 4 mm in diameter. No trace of the actual core was found however. Apart from the copper, one fragment of iron was recovered from the midden. Evidently the tip of a spear or knife blade, the piece of iron was roughly triangular in shape, measuring 70 mm in length and 27 mm at its widest, but so heavily encrusted with carbonate cemented sand that it was not possible to view the original surface of the artefact.

Fragments of glass beads were recovered from three different excavation trenches in the residential area of the site. These represented an estimated four beads, all of the opaque turquoise simple wound variety (*cf.* Van der Sleen 1967), and similar to those recovered by Hanisch (1980) from the Bambandyanalo site of Pont Drift. Locally manufactured beads of *Achatina* land snail and of ostrich eggshell were also recovered from the midden deposit. Under low magnification, the 77 land snail beads were easily distinguished by their slightly opalescent appearance. In contrast, the six beads of ostrich eggshell were somewhat chalky in appearance and noticeably thicker in relation to their diameter than those made from the land snail shell. Two bone awls or points recovered from the midden might represent the sort of tool used in the manufacture of the beads, although the larger of the two was 67 mm in length and had a small eye at the butt end, such as might be expected in a leather-working needle.

Among the stone artefacts found on the site, fist-sized dolerite pestles were predominant, all 18 examples being associated with the outer margin of the huts in the near vicinity of the suspected grainbin supports. This would indicate that milling and storage of grain were both carried out in this part of the site. Two further pestles recovered from the huts were about half fist-sized, and their highly polished surfaces suggested that they may have been used in the preparation of hides or the powdering of cosmetic substances. A crayon of haematite was found on the surface of the ground in the vicinity of the huts. Informal flaked stone artefacts recovered from the cattle pen trenches and the midden excavation may be associated with an earlier Stone Age occupation of the Bobonong Road hill side although this is not stratigraphically demonstrated.

Both human and animal remains were recovered from the Bobonong Road excavations. The human remains occurred as scattered finds in the excavation trenches

Table 1. Small finds from Bobonong Road

Item	Area			Total
	Pen	Huts	Midden	
Figurines	4	7	6	17
Furnace fragments		2	1	3
Slag fragments			3	3
Copper wire			1	1
Iron point			1	1
Glass beads		4		4
Snail shell beads			77	77
Ostrich eggshell beads			6	6
Bone awls & points			2	2
Small rubbers		2		2
Grain pestles		18		18
Flaked stone	2		1	3
Haematite crayon		1		1

through the cattle pen, and while it was obvious that the burials had been deliberately placed in or below the dung deposit, subsequent disturbance by vehicle traffic had destroyed much of the bone. The pieces recovered included some cranial fragments, left and right proximal femurs, some phalanges and the iliac portion of a pelvis. It was not possible to establish how many separate burials were involved, although all of the material was recovered from the up-slope part of the cattle pen adjacent to the midden and might therefore represent one burial.

A detailed analysis of the animal remains, comprising a total of 468 diagnostic skeletal parts, has been presented elsewhere (Hall 1993) and those observations are summarized here for the purposes of comparison with other evidence from the site. Sheep/goat (*Ovis/Capra*) and cattle (*Bos taurus*) dominate the faunal sample from Bobonong Road with totals of 26 and 23 individuals respectively. The presence of bones from all skeletal zones of both bovid size classes II (sheep/goat) and IV (cattle) (*cf.* Brain 1974) indicates that these domesticates were slaughtered in the village. Other taxa including hare, tortoise, guineafowl and small carnivores are of minimal importance. It is an unconfirmed possibility that domestic fowl (*Gallus gallus*) were present on this site as on others elsewhere in the region (Clutton-Brock 1993). Although livestock production may have been so successful that there was little reliance on wild game, the absence of wild bovids is surprising, given the high numbers of impala (*Aepyceros melampus*) found in the area today (pers. observ.). However, this may reflect a local range extension consequent to the reduction of other species during the last century, as suggested by Thomas and Shaw (1991:216, *citing* Campbell 1981).

The bulk of the faunal remains, as can be expected, came from the midden (61,5%) followed by the huts and the cattle pen, with 23,7% and 14,7% respectively. The contribution of the midden would increase proportionately if the calculations were adjusted for bone occurrence per unit volume of excavated deposit. When the distribution of the bone is considered, sheep/goat remains predominate in the midden and the hut area, while the reverse obtains in the sample from the cattle pen, where 86% of the cranial sample and 78% of the post-cranial bone is attributable to cattle. As Hall (1993) points out, even though the bone sample from the cattle pen is small, and the more abundant species on the site (sheep/goat) would therefore be expected to predominate, the reverse is the case. While these figures could be explained by different preservational circumstances in different areas of the site favouring the larger bone fragments of cattle over sheep/goat, it is as likely they reflect intentional patterns in the disposal of bone from slaughtered cattle.

Almost 50% of the sheep/goat were slaughtered in their second year (following Schmid 1972), and most were apparently slaughtered by their fourth year (Hall 1993). This suggests take-off of prime breeding animals rather than immatures, a somewhat anomalous pattern given that one norm for optimal herd management is to cull redundant males early on in their life and males and females at the other end of the age scale, when both in turn become reproductively redundant. The Bobonong Road slaughter pattern is nonetheless comparable to other Iron Age faunal assemblages from Botswana (Welbourne 1975; Turner 1987a, 1987b) and it is therefore possible that in these circumstances a large proportion of the young adult animals were castrated males rather than breeding stock. Estimates for the age at death of cattle indicate that relatively young as well as old animals were slaughtered but the sample size is too small for detailed interpretation.

DISCUSSION

The survey and excavation of stratigraphic features at Bobonong Road indicate a general layout in which the cattle pen, originally some 30 m in diameter and circular in shape, occupied the central position on the site. The midden deposit lay immediately up-slope and adjacent to the cattle pen. Surrounding these two clearly defined features was a clearing, up to 40 m wide, containing the huts and other related features such as grainbin supports. There is no clear indication of the spacing between the huts, and it is uncertain whether there were huts on both sides of the cattle pen, almost encircling it, or on only the up-slope side, ending at the midden. The stratigraphy of the site indicated a single occupation component which was dated to the second half of the thirteenth century AD on the basis of charcoal recovered from the midden excavation. This date, places the site in the Mapungubwe phase of the Leopard's Kopje Tradition (Maggs 1984), although the ceramic assemblage more closely resembles the earlier Bambandyanalo phase as described by Hanisch (1980). The presence of glass trade beads on the site likewise reflects the integration of Bobonong Road within the regional economy and settlement hierarchy, rather than long distance trade contacts between the site and the outside world. The beads and other evidence of trade also reflect the changing conditions at the turn of the first millennium, when the first indications of state formation begin to appear in the archaeological record of the Limpopo-Shashe region.

The evidence from the site confirms Huffman's (1984) expectations for the archaeological characteristics of Southern Bantu site layout, although the full extent of the area occupied by the huts is not clear. However, the relationship between the huts and cattle pen is confirmed, as is the concomitant segregation of male and female, or high and low status areas. For example, while cattle bones were found to be concentrated in the cattle pen deposits along with human remains, grain storage and milling artefacts were concentrated at the rear of the huts. Consistent with these gender and status distinctions was the disposal of small stock remains in the midden rather than the cattle pen, and the fact that clay figurines representing women were primarily found near the huts. While the midden and cattle pen were the most obvious archaeological features of the site, the bulk of the ceramics were found in association with the far less visible hut remains. These observations clearly illustrate not only the degree to which the symbolic precepts of Southern Bantu social organization determined the structured use of space at Bobonong Road, but their fundamental relevance for archaeological investigations.

ACKNOWLEDGEMENTS

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MATERIAL CULTURE 'UNDER THE ANIMAL SKIN': EXCAVATIONS AT ESIKHUNJINI, A MFECANE PERIOD NDZUNDZA NDEBELE SITE*

M.H. SCHOEMAN

Department of Historical Anthropology,
Albany Museum, Somerset Street,
Grahamstown, 6139

e-mail: a.schoeman@ru.ac.za

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ABSTRACT

Esikhunjini is a **mfecane** period Ndzundza Ndebele site in the Steelpoort River valley in Mpumalanga. Excavations at the site focused on sampling identity related material culture: settlement layout, houseform, middens and ceramics. The analysis highlighted the range of effects this period of conflict had on different types of Ndzundza material culture.

INTRODUCTION

Esikhunjini is an extensive site located on the north-eastern slopes of the Bothasberg in the Steelpoort River valley, Mpumalanga (Fig. 1). The examined section of the site is located half way up the slope and is approximately ten kilometres from the Steelpoort River. The settlement has been built on natural ledges, which have been expanded to accommodate the occupation. The hillside below the site is extensively terraced. These terraces pre-date the Esikhunjini occupation, possibly dating to the KwaMaza period and are presumably agricultural.

Obviously, the Esikhunjini settlement dates from before the occupation of the area by colonists and consequently it was not documented in writing. However, when Fourie (1921) was recording Ndzundza oral histories, there still could have been elders who, as children, were part of the occupation at the site, or whose parents had lived there and pointed it out to them.

C.J. Van Vuuren was taken to Esikhunjini in 1979 by informants. The name Esikhunjini translates as "under the animal skin" (place under cover), alluding to the defensive position of the site and the shelter it provided during the turmoil of the **mfecane**. While the name does not appear in a specific **isibongo**, it reoccurs numerous times in oral history testimonies (Van Vuuren & Schoeman 1996).

Recorded oral traditions state that after the final destruction of KwaMaza by Mzilikazi in the early 1820s, Siboko (the last leader at KwaMaza) was succeeded by his brother Somdeyi. Under his leadership the Ndzundza eventually returned to the Bothasberg and settled at Esikhunjini. However, the departure of Mzilikazi did not signal regional peace, and this is reflected in the defensive hill-slope location of Esikhunjini. Subsequently, the settlement was attacked, burnt down and Somdeyi was abducted and presumably killed (Fourie 1921:38-9). Different sources contain contradictory information on Esikhunjini's attackers. One Ndzundza oral account states that it was forces led by Mzilikazi, while another states that it was the Swazi army. Pedi oral history (Hunt 1931:284) records a Pedi attack on the Ndzundza at this time.

The power of place is evident in the current Ndzundza relationship with Esikhunjini. While I was excavating the site in 1994, during a period of drought, several members of the Ndzundza royal family visited the site to pray for rain. During discussions, the elders pointed out that the site holds power, because it is where some of their ancestors lived and are buried. Through them they pray for rain. Furthermore, the current farm owner recalls that numerous male initiation schools have been held at the site.

ARCHAEOLOGY

The examined section of the site consists of three stone walled homesteads. These are interlinked and in close proximity to one another. They have been named Homestead 1, Homestead 2 and Homestead 3 (Fig. 2). The rest of the site is located immediately downslope. The highest portion of the settlement was chosen for study, as this high status position (*cf.* Kuper 1980:17-18) is comparable to that of KwaMaza A and B, on the previous site in the sequence (Schoeman 1998).

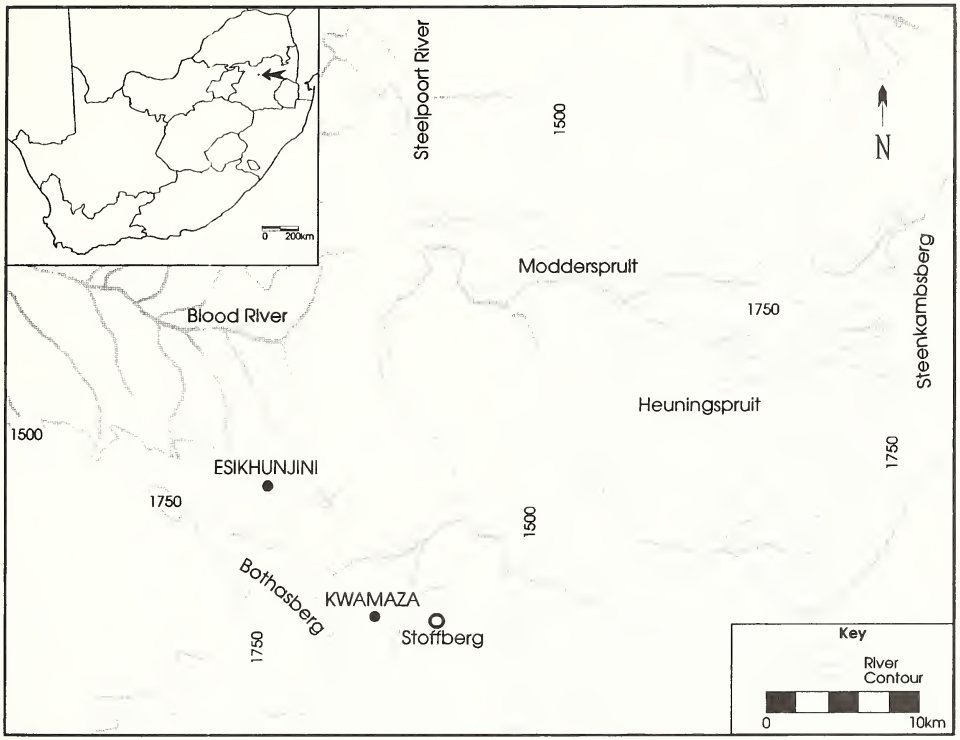

Fig. 1. Map of a section of the Steelpoort River Valley, showing the location of the site under discussion.

Homesteads 1, 2 and 3 were mapped, and excavations sampled kraals, domestic areas and middens.

FEATURES

Enclosures and Terracing

The three homesteads examined at Esikhunjini are distinguished by each having its own centrally located stone walled enclosure. These are similar in their layouts, consisting of two compartments; the larger upslope from the smaller (Fig. 2). Secondary enclosures were built into the walls of the Homestead 1 and 3 upper compartments. The central enclosure at Homestead 2 (has no structures within the its walls) is also substantially larger than those at Homesteads 1 and 3.

The relationship between the enclosures and the surrounding domestic areas is constrained by the slope gradient. At Homestead 1 and 3 both areas are restricted to a single terrace. The fronts of these homesteads drop off sharply down steep slopes.

The situation at Homestead 2 is different. Here the central stonewalled enclosure and residential zone are located at two different heights. The enclosure has been built within a natural bowl, below a terrace upon which the domestic area is located. In turn, this area of Homestead 2 is higher than the levels upon which Homesteads 1 and 3 are built.

Homestead 1

The 1,50 m high stone wall of the Homestead 1 central enclosure has collapsed in parts. It has a 10m diameter lower, and a larger upper compartment 18m in diameter, which has two secondary enclosures located in the left[1] and one in the right hand wall. A semi-circular stone wall joins the southern outer wall (Fig. 2).

Due to wall collapse, entrances couldn't be identified. The similarity in layouts between Homestead 1 and 3, however, suggests that there would have been entrances leading from the smaller enclosures into the upper compartment, as well as external access ways through the top and right hand walls (Fig. 2).

In Homestead 1 three circular, smaller stone wall structures are located south-west of the central enclosure. The first, 4,8 m in diameter, faces north east (Fig. 2:H1S1). The second, 9,50 m diameter, has a downslope facing entrance and a smaller, secondary enclosure built

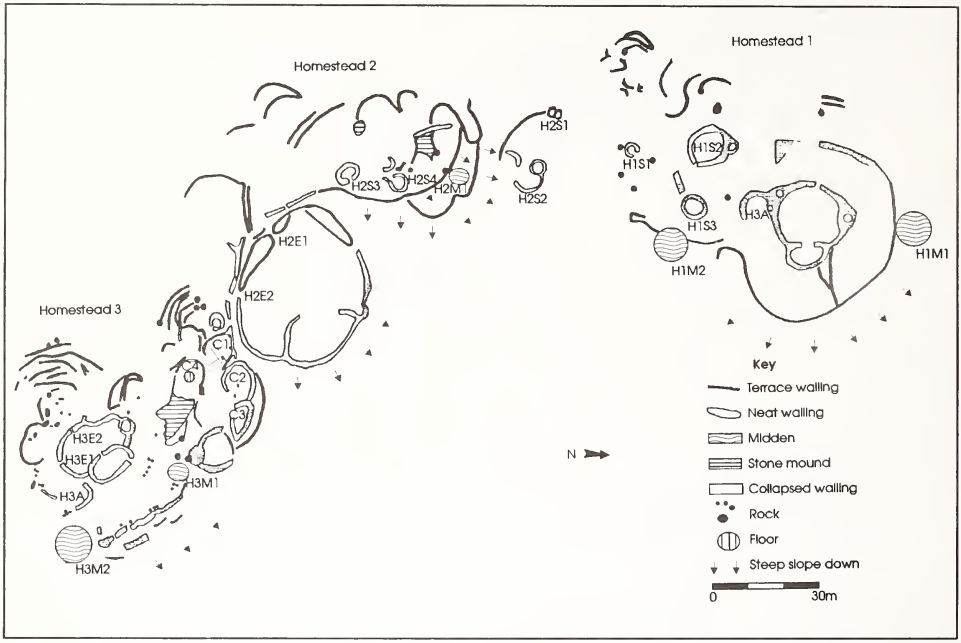

Fig. 2. Settlement plan of the Esikhunjini site Homesteads 1, 2 and 3 .

into the right hand wall, connected to it through a low (0,50 m) access way, covered by a lintel (Fig. 2:H1S2). The entrance to the third structure, associated with a 10m long and 0,55 m high stone wall, could not be located due to wall collapse (Fig. 2:H1S3).

The downslope edge of Homestead 1 is marked by a sharp drop-off. Low one-stone-high ridges radiate out from the central enclosure to the edge of this terrace, and may indicate household space. A number of terraced bays are located upslope from the stone walled structures, also demarcating domestic zones.

A 1x2 m trench was excavated in the upper compartment of the central enclosure at Homestead 1. The purpose of this excavation was twofold. The first was simply to sample for dung and the second was to investigate a distinct step running north-south across the enclosure. No dung was found and excavation showed the step to be natural.

Homestead 2

The stonewalled Homestead 2 central enclosure consists of two compartments; a 22 m diameter lower and an upper, 38 m at its maximum diameter (Fig. 2). There are two external entrances leading out of the upper compartment, one on the right (Fig. 2:H2E1) and one at the top leading onto the much higher domestic terrace (Fig. 2:H2E2). Two round bi-lobial circular enclosures are located upslope, to the north-west of the central enclosure (Fig. 2:H2S1 & H2S2).

On the terrace above the assembly area there are two small stone structures, the entrance of the one faces north-east (Fig. 2: H2S3) and the other is accessed from the south-west (Fig. 2:H2S4). Additionally, there is a small semi-circular stone wall and a low stone wall 12m in length. In proximity to these there are a number of large smoothed boulders, which seem to have been used as 'benches'. At the back of the terrace there are a number of bays dug into the hill (Fig. 2).

Homestead 3

As in Homesteads 1 and 2, the Homestead 3 central enclosure is bi-lobial. The maximum diameter of the lower compartment is 11 m and that of the upper one is 19,5 m. It has a smaller enclosure within the left hand wall. There are two external access points into the structure, the larger one is located in the right hand wall and the smaller entrance is situated at the top of the enclosure. A semi-circular wall was built to the right of the main enclosure (Fig. 2).

The central enclosure is surrounded by domestic space, this is located in front, on the left and at the back on terraces bays excavated into the hill. The residential areas are placed on the same terrace level as the kraal. The front of the homestead, facing downslope, is defined by a low stone wall, with several discrete entrances, each granting access to individual households.

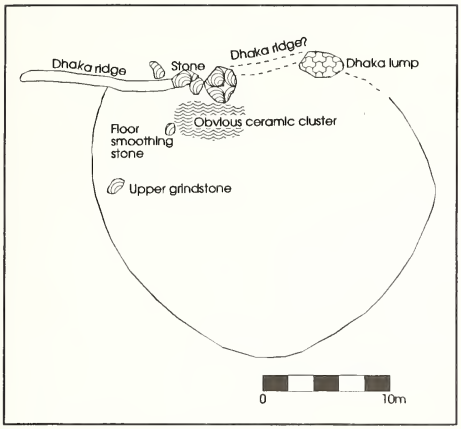

Fig. 3. Plan showing the Esikhunjini Homestead 3 Courtyard 4 House Floor.

House Form

Four areas were excavated in an attempt to find house floors. Two trenches were dug in Homestead 3. The first (2x10 m) one in Courtyard 1 was 0,10 m deep. This uncovered a small circle of stone, surrounded by charcoal post remains, on the left hand side of the courtyard. These remains could be from a grain bin. On the right hand side a lower and upper grindstone were recovered. No house remains were found (Fig. 2:C1).

A 2x12 m trench was initially excavated into Courtyard 4 in Homestead 3 (Fig. 2:C4). This uncovered a circle of single stones 8,70 m in diameter. Excavation within this stone circle revealed a preserved baked clay (**dhaka**) floor, 2,95 m in diameter. This floor had a preserved ridge at the front (Fig. 3). **Dhaka** lumps (smoothly plastered on one side, pole impressed in the middle and grass impressed on the other), as well as charcoal and burnt thatch were found in the rubble overlaying the floor. A small ring of stone was located next to the floor on the left hand side of the courtyard.

Two 1x1 m squares were excavated in Homestead 3, Courtyard 2 (Fig. 2:C2). The surface 0,03 m consisted of a dark red-brown deposit, while the next 0,17 m was a uniform red soil. The excavation revealed no **dhaka** or other indications of house remains. Additionally a 2x1 m test trench was excavated, into the terrace above the assembly area in Homestead 2, in order to locate other floors. The excavation was 0,20 m deep and consisted of a sterile uniform hard red rocky soil. It yielded no evidence of house remains. A 1x1 m test square, in what appeared to be a back courtyard of the domestic terrace of Homestead 2, produced nothing other than uniform hard red sterile earth.

Middens

The middens at Esikhunjini were difficult to identify, since they are relatively shallow. Furthermore, they formed near the front entrances of the homesteads and, consequently, were distributed down sharp slopes. All revealed similar stratigraphy; consisting of alternating layers of ash and relatively sterile red soils. Three were excavated, two associated with Homestead 3 and one associated with Homestead 2.

Five square metres were excavated in Homestead 2 Midden 1. This midden was located on a steep slope below a house-terrace (Fig. 2:H2M1). The depth varied, but the deepest section of the trench was 0,73 m. The top deposit (Surface) consisted of red-brown wash. The second, Ash 1, was confined to the northern part of the excavation. Below this was a larger ash layer (Ash 2) rich in cultural material. The fourth (Dark Red) and fifth (Red) deposits consisted of artefact poor dark red and red soil respectively. The sixth layer consisted of an ashy artefact rich deposit (Ash 3). The last stratum, Red 2 lay on bed rock (Fig. 4).

Red 2 was dated (Wits 2408), using C14, to 1760 ± 70. This calibrates to AD 1656, AD 1738, AD 1810 or AD 1945.

Five square metres were excavated into Homestead 3 Midden 1 (Fig. 2:H3M1). The depth of the deposit varied due to the slope of the midden. The midden was covered by a thick red-brown deposit (Surface), the depth ranging between 0,10 m and 0,21 m. The second to fourth layers (Ash 1, Ash 2, Ash 3 and Ash 4) were artefact rich, ashy deposits. There had been some disturbance due to rodent burrowing and termite activity (Fig. 5).

Radiocarbon was used to date Ash 2 0,1 - 0,2 m. It dated (Wits 2409) to 1920 ± 70, which calibrated to AD 1689, AD 1732, AD 1812 and AD 1934.

Two 1x1 m squares were excavated in Homestead 3 Midden 2 (Fig. 2:H3M2). The depth of the midden was uniform at about 0,40 m. The midden was covered with a grey-brown deposit (Surface). The second layer (Ash 1) was artefact rich. White Ash overlay Red, which was artefact poor in relation to the other layers. Ash 2 consisted of a rich ashy patch. It was underlain in turn by Grey Ash which contained an abundance of charcoal and was rich in fired wall **dhaka**. Ash 3 covered bed rock (Fig. 6).

Grey Ash was dated (Wits 2410) to AD 1770 ± 70, using C14. This date calibrates to AD 1689, AD 1733, AD 1813 and AD 1937.

The basal deposits of the Homestead 3 middens resembles 'clean up' for occupation layers, as they contain large amounts of charcoal and house rubble.

The lowest possible layer from all three middens has been radiocarbon dated. All radiocarbon dates are of limited value, given that the site can be dated more accurately through the oral records. Oral accounts and the presence of glass trade beads indicate that the early nineteenth century calibrations are the correct dates.

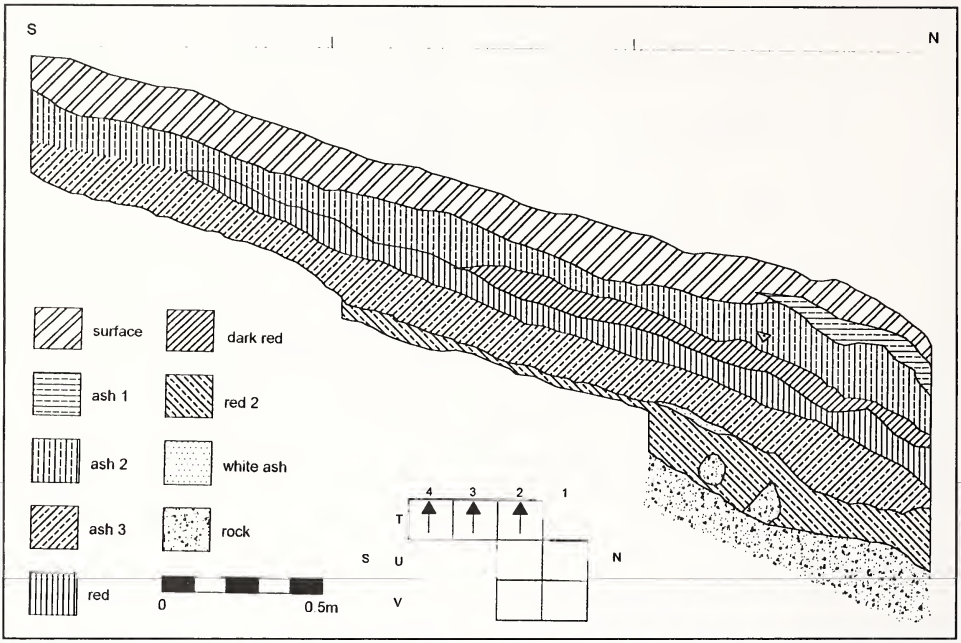

Fig. 4. Section drawing of the Esikhunjini Homestead 2 Midden 1 West profile.

THE FINDS

Ceramics

Out of a total of 1150 ceramic sherds recovered from the excavations, only 64 (5,6%) were decorated. One hundred and thirty-nine of the total sample (12,1%) were rim or neck fragments. Of these 129 (92,8%) were from jars, and 27 (20,9%) of the jar pieces were decorated. Ten (8,7%) came from undecorated bowls.

Not all of the decorated sherds could be allocated to classes, due to their small size. On the basis of motifs, 7 could be assigned to the Eiland phase of the Early Iron Age. Two other sherds originate from another even Earlier phase of the Early Iron Age and one was, possibly from a Letaba vessel (Fig. 7). The rest of the assembledge consisted of Late Iron Age ceramics. The following ceramic types were present:

Type 1: recurved jar with a band of decoration on the rim (1 sherd);
Type 2: recurved jar with a band of decoration in the neck (sherds);
Type 3: recurved jar with a band of decoration on the lip (1 sherd) (Fig. 8);
Type 4: recurved jar with a band of oblique incision on the rim, graphite below that, an arcade incised on the shoulder, the body covered with ochre and the inside of the rim covered in ochre (5 sherds) (Fig. 9).

The Type 1, 2 and 3 were coarsely made, whereas the Type 4 ceramics were thinner and neatly made.

Other finds

The other finds are tabulated below:

Homestead 2 Midden 1
Surface: 1 piece of ostrich egg shell
Ash 1: 7 ostrich egg shell pieces
1 dark blue glass bead
1 wound copper spiral
2 copper beads
Ash 2: 1 wound copper spiral
Red 2: 1 white glass bead

Homestead 3 Midden 1
Surface: 1 sky blue glass bead
1 white glass bead
Ash 1: 1 iron spear-head (Fig. 10)

Homestead 3 Midden 2
Ash 1: 1 unidentifiable broken clay figurine fragment
1 white glass bead
1 blue glass bead

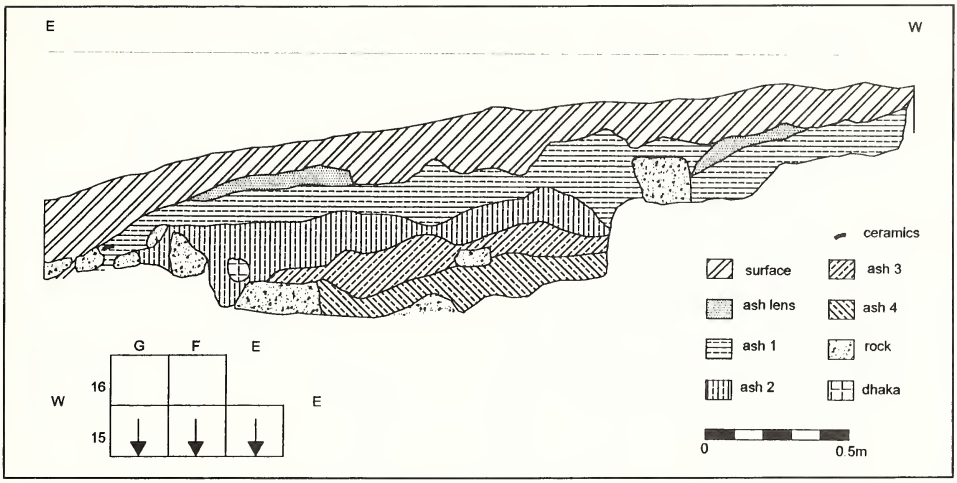

Fig. 5. Section drawing of the Esikhunjini Homestead 3 Midden 1 South profile.

Red: clump of molten glass beads
White Ash: 1 white glass bead
2 red glass beads
1 blue glass bead
Grey Ash: clump of molten silica

Homestead 3 Courtyard 1: 1 upper grindstone
1 lower grindstone

Homestead 3 Courtyard 4: 1 upper grindstone

Plant remains

Carbonized millet was found in Homestead 3 Midden 1 Dark Red and Ash 2. Carbonized sorghum was found in Homestead 3 Midden 1 Ash 3, Homestead 3 Midden 2 Ash 1 and White Ash. Three carbonized maize cobs were found in Homestead 3 Midden 1 Ash 1.

This is the first direct evidence for maize in the area, although this discovery was not unexpected, since Esikhunjini dates to the 1820s, and maize was introduced into the interior at some time in the eighteenth century (Hall 1995:312).

DISCUSSION

The central enclosure at Homestead 2 has been identified as an assembly area for a number of reasons. Its position below the senior homestead is identical to that of the assembly area at KwaMaza (Schoeman 1998:48). Furthermore, there are no cattle tracks leading into the area, and the enclosure is not closed at the top, although the terrace upslope could have functioned as a barrier.

The central enclosures in Homesteads 1 and 3 functioned as cattle kraals. This is indicated by their central location within the homesteads which is consistent with the ethnography (*cf.* van Vuuren 1980:44). Secondly, the location of stone wall cattle tracks leading to Homestead 3 is congruous with directing animals into these enclosures. These kraals are also completely enclosed, with entrances at the top and in the right hand wall of the upper compartments. The different width of the entrances into the kraal at Homestead 3, suggests that the narrower upslope entry point (Fig. 2:H3E1) was for human use, while the right, wider access way (Fig. 2:H3E2) was for cattle.

The semi-circular wall located to the right of the Homestead 1 and 3 kraals could have functioned as male assembly areas or courts (**ibandla**) for these individual homesteads. This interpretation is supported is by the location of these areas on the right (**ubene**) hand side, since, in contemporary Ndzundza practise the homestead **ibandla**, normally a stone walled semi-circle, is always located on the **ubene** side of the kraal (Van Vuuren 1980:146; W. Mahlangu, pers. comm.).

It is likely that the smaller secondary enclosures in the kraal walls were used to house calves, as this would be consistent with Ndzundza ethnography (Van Vuuren 1980:148).

The smaller stone enclosures, scattered around the site, were probably used to house small stock. This is suggested by the low linteled entrance linking the compartments in one of the enclosures (Fig. 2: H1S2) at Homestead 1 as well as ethnographic accounts (Van Vuuren 1980:149).

In spite of its defensive location, and the spatial constraints this introduced, the Esikhunjini settlement layout shows a number of marked similarities to that of KwaMaza, the previous site in the Ndzundza Steelpoort River valley sequence (Schoeman 1998). First, this can be seen in the layout of the central enclosures the

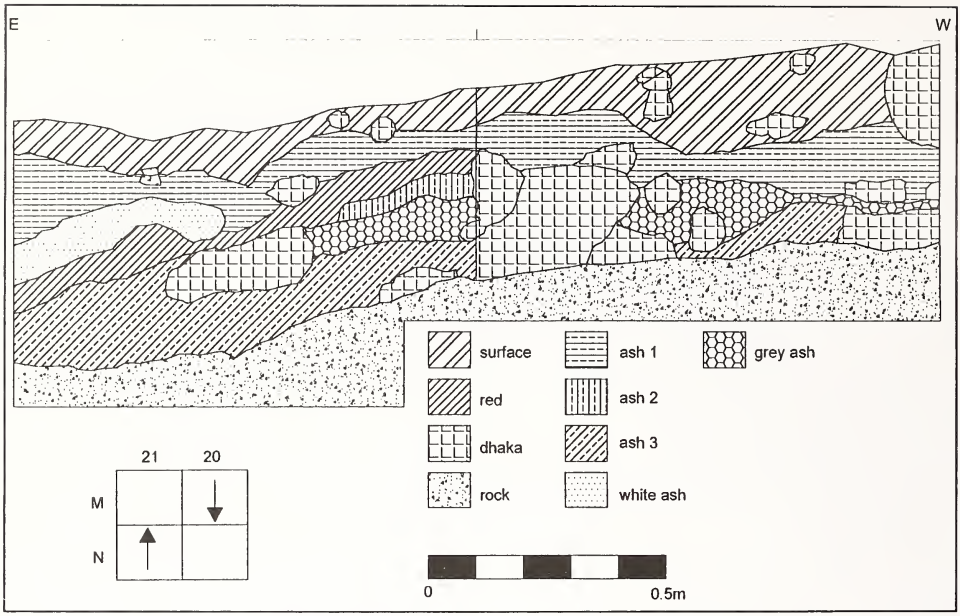

Fig. 6. Section drawing of the Esikhunjini Homestead 2 Midden 2 M20 square South and N21 square North profiles.

ibandla (court) and **isibaya** (kraal). The stone wall central enclosures are constructed in the same bi-lobial manner, with a large upper and smaller lower compartment. The enclosures face upslope, as do those at KwaMaza. Secondly, as with the use of stone at KwaMaza, the kraals and assembly areas are demarcated by stone walls, but not the peripheral domestic areas.

The Esikhunjini spatial layout discussed above suggests internal structuring principles that were still regionally distinct. There are no similarities to the Badfontein sites excavated by and Collett (1982) and the Lydenburg sites excavated by Evers (1975). In contrast, the settlements discussed by Evers and Collett consisted of circular stone walled central enclosures with a number of semi-circular stone walled enclosures attached to the outer side. Domestic areas are located in a circle or arch around the central enclosure, and were separated by a wall from the veld beyond.

Only one preserved house floor was found in the domestic areas, and this is clearly not a representative sample. The excavation of this floor does, however, provide a number of clues as to house structure. First, well preserved **dhaka** found on the floor was plastered on one side, pole impressed in the middle, and grass impressed on the other side. These impressions would suggest that the structure consisted of a pole framework that was thatched and plastered. Secondly, the house burnt down, as can be seen from the well baked floor and baked wall **dhaka**. However, only a small amount of wall **dhaka** was found on the floor in the Homestead 3 Courtyard 4 area, which indicates that the wall was not high. In present day Swaziland and KwaZulu-Natal, there are numerous examples of semi-plastered beehive houses. These structures have low walls (0,50 m to 1,0 m) that are no higher than waist level at the base, with a thatched beehive above (Friede & Steele 1980:175). The combination of thatching and plastering the framework at the base, would produce the pattern of grass impressions on one side, pole impressions in the middle and smooth plaster on the other side evident in the Esikhunjini wall **dhaka.**

In light of this, I suggest that the Esikhunjini houses consisted of a thatched grass and **dhaka** beehive. This appears to be a modification of the thatch beehives at KwaMaza. In the historical context of the Esikhunjini occupation, the new house shape could have been a product of the **mfecane** disruption, as house form is shaped by identity, which in turn is a relational concept. It is important to note that Ndzundza identity, in this period, would have been defined partially in relation to the Pedi, as the **mfecane** resulted in a realignment of regional politics, with the Pedi playing an increasingly prominent role. Oral history also records that the ruling dynasty stayed with the Pedi, after the destruction of KwaMaza (Fourie 1921). In this context the change of house form may have been an attempt to signal more similarity with the Pedi and thus the corresponding shift away from traditional Ndebele house form.

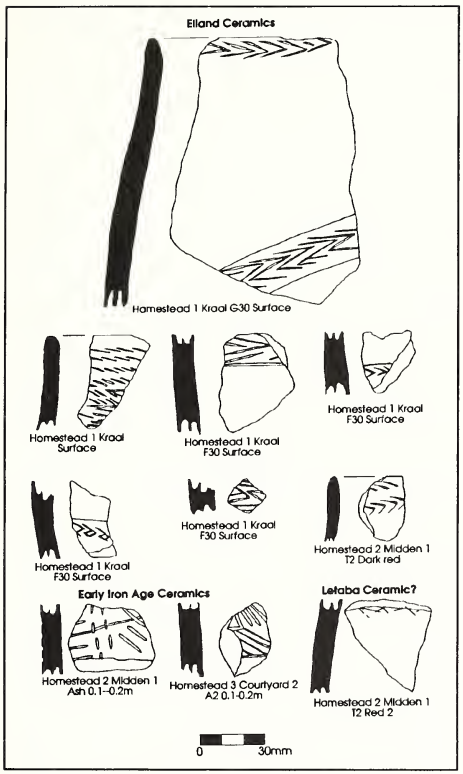
Eiland Ceramics
Homestead 1 Kraal G30 Surface
Homestead 1 Kraal Surface
Homestead 1 Kraal F30 Surface
Homestead 1 Kraal F30 Surface
Homestead 1 Kraal F30 Surface
Homestead 1 Kraal F30 Surface
Homestead 2 Midden 1 T2 Dark red
Early Iron Age Ceramics
Letaba Ceramic?
Homestead 2 Midden 1 Ash 0.1-0.2m
Homestead 3 Courtyard 2 A2 0.1-0.2m
Homestead 2 Midden 1 T2 Red 2
0
30mm

Fig. 7. Drawings of Eiland, Early Iron Age and Letaba? ceramic sherds from Esikhunjini.

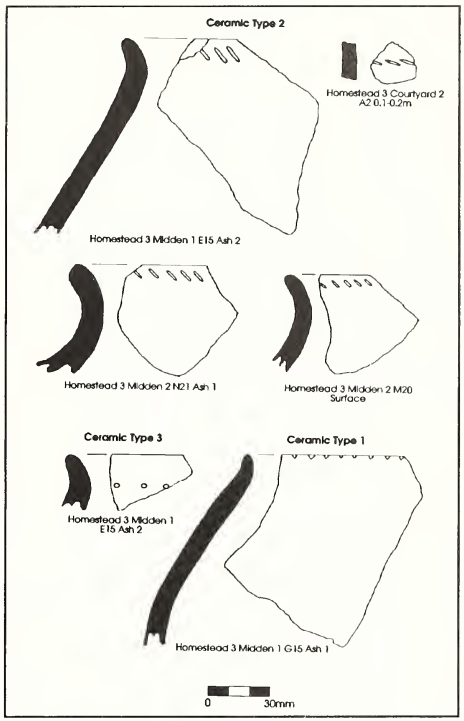
Ceramic Type 2
Homestead 3 Courtyard 2 A2 0.1-0.2m
Homestead 3 Midden 1 E15 Ash 2
Homestead 3 Midden 2 N21 Ash 1
Homestead 3 Midden 2 M20 Surface
Ceramic Type 3
Ceramic Type 1
Homestead 3 Midden 1 E15 Ash 2
Homestead 3 Midden 1 G15 Ash 1
0
30mm

Fig. 8. Drawings of Ceramic Types 1, 2 and 3 sherds from Esikhunjini.

Furthermore, this change created a material distance between the Ndzundza and the Nguni raiders. Other groups in the region, consequently, might have associated the Ndzundza less with the Nguni raiders. Whether the Nguni or Pedi elements of the house form should be seen as dominant would depend on the articulation of internal identities with regional relationships.

The next identity marker at Esikhunjini, the middens, are located in front of the homesteads over the perimeter walls and are capped at regular intervals with sterile red soil. In the Nguni world it is believed that the ash could be used in maleficent magic against the owner of a homestead. Ash heaps are, therefore, located in front of homesteads, so that they can be observed constantly (Raum 1973:145-146).

The Esikhunjini middens closely resemble the capped middens at KwaMaza (Schoeman 1998) and the 'Ndebele' middens of Loubser (1994) and Huffman and Steele (1996), both in their location and stratigraphy. The middens, however, appear to be capped more regularly and thoroughly than the KwaMaza middens. This would suggest not only continuity, but intensification of the beliefs relating to the protection of ash against witchcraft, first apparent at KwaMaza. The intensification is not surprising, since Esikhunjini was occupied after the destruction of KwaMaza and occupation continued during a period of intense conflict.

On the other hand the pottery, though largely undecorated, has not changed and is similar to the ceramics found at KwaMaza (Schoeman 1998), and the Marateng ceramics found by Collett (1982). These are generally referred to as 'Pedi' ceramics (Laidler 1932; Lawton 1967; Evers 1989). During the occupation of Esikhunjini the initial signalling of regional inter-group alliance, would not only have continued, but could have intensified. A common style now would have further underlined a common alliance with the Pedi, the main Sotho group in the area, with whom they found shelter for a period during the **mfecane**. This interpretation is endorsed by the incorporation of new elements in the way women plastered the houses.

CONCLUSION

Excavations at Esikhunjini highlighted the disparate impact of the **mfecane** disruptions on the different types

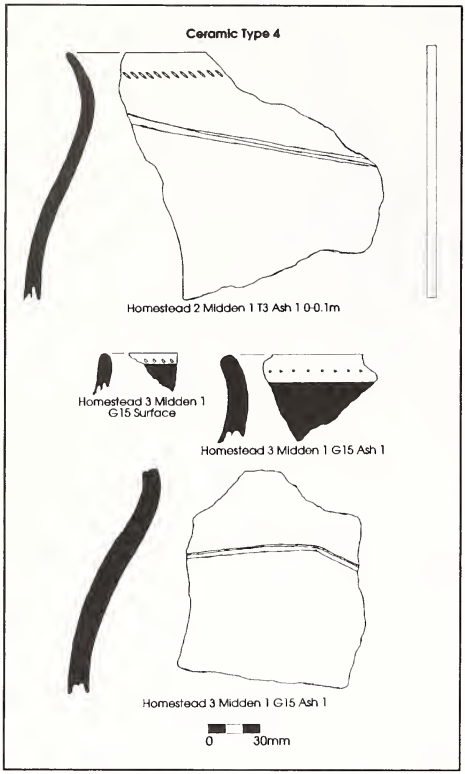
Ceramic Type 4
Homestead 2 Midden 1 T3 Ash 1 0-0.1m
Homestead 3 Midden 1 G15 Surface
Homestead 3 Midden 1 G15 Ash 1
Homestead 3 Midden 1 G15 Ash 1
0
30mm

Fig. 9. Drawings of Ceramic Type 4 sherds from Esikhunjini.

Ndzundza material culture. Settlement layout is similar to that of the previous site is the Ndzundza Steelpoort River sequence, KwaMaza and is regionally distinct. The houseform, on the other hand, now incorporates regional elements. The midden location is similar to that at KwaMaza, but the midden structure, which is particularly 'Ndebele' signals intensification of witchcraft beliefs. The continuity of 'Pedi' style ceramics persist to articulate a regional identity, possibly underlining the alliance with the Pedi.

ENDNOTE

1. Left or right refers to the direction when facing into the entrance of a structure. When discussing the site in general left or right refers to the direction when facing down slope.

ACKNOWLEDGEMENTS

The Kuhn family for allowing me access to their farm Rhenosterhoek (180JS), on which Esikhunjini is located.

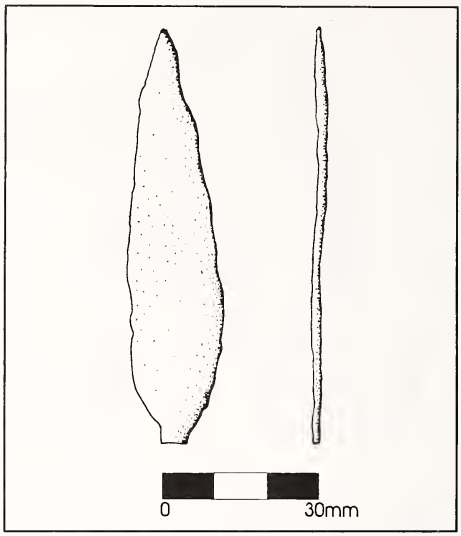

Fig. 10. Drawing of a metal spearhead from Esikhunjini.

The Ndzundza royal family who kindly gave their permission for this research. J. Mahlangu and W. Mahlangu for sharing their knowledge on Ndzundza oral history, social organisation and settlement layout. K. Sales (University of the Witwatersrand) for the AutoCAD graphics. C. Van Vuuren for sharing his knowledge of Ndzundza social anthropology. S. Hall, for his guidance during my MA research. H. Domleo, Wits Archaeology II Classes of 1994 and 1995, H. Schoeman, J. Schoeman and B. Ward for assisting in the field. The University of the Witwatersrand Postgraduate Merit Award and Karen Feldman Memorial Scholarship for providing financial assistance for my M.A. research on which this paper is based. The financial assistance of the Centre for Science Development, (HSRC) towards this research is hereby acknowledged. Opinions expressed and conclusions arrived at, are those of the author and are not necessarily to be attributed to the Centre for Science Development.

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NOSE-BLEED IN ZEBRA ROCK PAINTINGS, ZIMBABWE*

F.G. BUTLER

122 High Street, Grahamstown, 6139

C. CANNAN

2715 East Grace Street, Richmond, VA 23223, U.S.A.

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ABSTRACT

A cornerstone of the argument in an article on "Nose-bleed in Shamans and Eland" (Butler 1997) was the medical evidence that nose-bleeds very rarely occur among human beings during extreme and protracted physical exercise. In this paper, medical evidence is used to support the thesis that certain Zimbabwean rock paintings of zebras bleeding from the nose represent the final stages of a zebra hunt in which the equid's lungs have given way after long and relentless pursuit by a bipedal primate whose lungs do not give way to nose-bleeding under such strain. The evidence is discussed in the context of the following: (1) The prevalence of running down game, particularly in Khoisan societies; (2) Altered states of consciousness, experienced by South African hunters-gatherers; (3) The physical responses of zebra to running down; (4) Conclusion.

INTRODUCTION

This paper owes its origin to a comment by Peter Garlake in a letter of 1 February 1996 addressed to the author.

> There is one peculiar feature of the zebra in rock art - it is characteristically shown head lowered and bleeding from mouth and nose, yet these zebra are never shown hunted or pierced by arrows or associated with hunters. I cannot interpret this.

Horses and Zebras

As the entire argument of this essay depends upon the assumption that the horses and zebras are so closely related that what is true for the horse is true for the zebra, we will devote some space to justifying this assumption.

From the evidence of Rock Art in Zimbabwe, we know that zebras suffer from nose-bleed. It is also common knowledge that horses suffer from nose-bleed.

We know a great deal about horse nose-bleed. Are we justified in applying this knowledge to the zebra? We advance the following arguments.

1. Scientific

Horses, zebras and asses are all included in one family, Equidae Genus Linaeus Equus. Walker (1983) refers to Bennett (1980) who argues that the horse, quaggas and zebras should be united in a single sub-species.

2. Mating

Smithers (1983:576) states that Burchell's zebras mate freely with donkeys, producing offspring known as zebdonks. Such hybrids were used in pioneer days in tandem with mules. Donkey stallions also mated with zebra mares (see also Walker 1983).

3. Domestication

There is ample evidence that the zebra can be trained to harness and ridden, with some difficulty, like a horse. Zeederberg (1971:132) gives a detailed account of training zebras for coach transport in the 1890s, the major effort being to use them on the Pietersburg-Pretoria run. The only difficulty the zebras presented was inferior stamina.

> This final experiment proved conclusively that zebras could not be economically used for coach transport over long distances ... There was no reason, however, why they could not be used in wagon transport, and many transport riders in the north ... did so.

But if zebras failed as draft animals for coach transport over long distances in the Transvaal they were used successfully over short distances with light loads in Southern England for the better part of a decade. From 1905 to 1914 they drew delivery vans of the Mazawatatee Tea company, a popular and successful advertising ploy (James 1992).

Fig. 1. Mazawatee delivery van, England.

Baron Walter de Rothschild, the great zoologist, imported Burchell's zebras, which he harnessed simply in a trap breaking them in himself. This was a prelude to driving a four-in-hand to Buckingham Palace, much to his father's fury, who dreaded that the unpredictable beasts might bite or kick royalty. (Rothschild 1983:46)

There is no suggestion here, or in other accounts, that they display unexpected dietary or physiological differences from the horses and ponies which they resemble so closely.

THE PREVALENCE OF RUNNING DOWN GAME IN KHOISAN SOCIETIES

The prevalence of running down a wide variety of animals in Khoisan societies is well attested. Cornwallis Harris, writing in the 1830s, gives ample evidence of regular runnings-down.

> We more than once, fell in with a large party of Coranna's engaged in an attempt to tire out an ostrich on foot, a feat which they are sometimes said to achieve. (1969:59)

Harris himself describes the ease with which the great male eland could be run down within a mile by a man on horseback, ascribing to this fact its extinction in the Cape Colony; by Boer and Griqua hunters who possessed horses and firearms. But he also supplies us with a key corroboration of the practice of running eland down on foot.

> Even the savages who have no horses, not infrequently race them down on foot, and then stab them with their assegaais... (Harris 1969:37; see also Sparrman 1977 Vol. II:162).

This practice continued into the present century. For example the pursuit of a wounded buffalo could continue for as many as four days (Thomas 1950:175). Sir James Alexander, (1858:261-263) gives us a detailed account of a Namaqua, Hendrick, running down a zebra.

> When Hendrick's powder ran short he took a hunting knife in his left hand... and knowing there were zebras in his neighbourhood, he went out to the field to seek them, to their grazing ground, and to run them down.
>
> He paced over the plain glancing at the ground for foot marks, and on each side of him, with his keen eyes. Presently the troop itself is seen grazing near. Hendrick stoops, disencumbers himself of every skin covering which might encumber him, even to his leopard skin cap, and steals as near as he can to the game without being perceived; but the watchful eye of the stallion discovers the hunter, when he leaves the cover of the bushes, and giving the alarm to the rest, the whole gallop off. Hendrick, without putting himself to the top of his speed at first, follows them; the zebras stop to graze, Hendrick running like race horse, with his stomach near to the ground, bounds toward them. Away they rush again... The hunter "sits on their skirts", and relaxes not from his pursuit for a moment; he clears stones, bushes, and other impediments; after three or four miles he is in perfect wind; the ground seems to fly from under him; and, as he expressed it, he was now unable to distinguish the heaven from the earth. The zebras stop and gaze occasionally, as before; but it is now but for an instant, for their enemy is closing with them; he drives them towards a steep face of rock; they hesitate about the means of escape; Hendrick is amongst them in a moment, and seizing one of the striped troop by the tail, he swings it to one side, throwing the whole

> weight of his own body towards the ground at the same time. The zebra falls on its side, when Hendrick instantly plunges his knife into its chest, and then allows it to rise and run off; it keeps up with the rest for a short distance, then gradually falls behind the troop, weak from loss of blood. Its comrades wait for it till Hendrick again dashes forward, repeats his fatal thrust, and if two stabs are not sufficient to stretch the zebra dead on the plain, a third is given, which rolls the beautiful body lifeless on the ground, covered with dust and perspiration. The successful hunter then returns to his huts to send his people with pack oxen to bring home the prize.

Attention is drawn to the following points.

1. Zebra were regarded by Namaqua as normal food.

2. Hendrick's approach is matter-of-fact and expert though old fashioned and is resorted to only when short of powder (*ibid.* :261)

3. The technique is relentless pursuit of animals who are initially confident in their power to escape pursuit from a predator (such as a lion) by initial bursts of great speed. Lions do not pursue their prey at speed for long, up to a maximum of 100-200 metres. (Smithers 1983:379; Walker 1983:1086). Hendrick's zebras clearly do not expect this ineluctable pursuit.

4. Hendrick only continues his pursuit until the moment he can overtake a flagging beast, seize it by the tail, fling it off balance to the ground, and use his hunting knife. The beast is allowed to resume flight, only to be stabbed again until it collapses from loss of blood (*ibid.* :263).

5. Hendrick does not seem to be exhausted by his venture, but is very matter-of-fact about it. There is no suggestion that he has reached the end of his tether, as his victim has. He could have continued his pursuit, but his possession of a steel knife made this unnecessary.

6. Hendrick reports his state of mind to Sir James Alexander:

> After three or four miles he is in perfect wind, and, as he expressed it, he was now unable to distinguish the heaven from the earth (*ibid.* :263).

However we interpret this - possibly as a 'runner's high'- Hendrick thinks it important enough to report that he experiences a change of consciousness. Normal distinction between "heaven" and "earth" have disappeared.

Running down and ritual - male puberty

In many Kalahari societies a young male cannot marry until he has proved himself as a hunter, able to provide for his wife and family.

> Among the Northern and Namib Bushmen, indeed, it is obligatory on the bridegroom that he should kill a head of big game and present it either to the bride or her mother at the marriage feast. (Schapera 1930: 105).

The San boy's first kill is marked by a rite of passage into manhood and so into spiritual membership of the tribe (Dornan 1925:125; Biesele 1993:123).

Apart from the rite of passage, running down may well have had other 'religious' functions where the purpose is to secure the blood of the animal for a symbolic act of communion such as Lewis-Williams and Dowson (1989) have persuasively advanced as part of the ritual killing of the eland. The emphasis on ample blood supply in the sacred and potent paintings is marked (see particularly Lewis-Williams 1988:4; Lewis-Williams & Dowson 1989:36; Jolly 1986:41).

ALTERED STATES OF CONSCIOUSNESS EXPERIENCED BY HUNTERS

We now move from physiological to the neuro-psychological aspects of the hunt. Although Hendrick's body remains an extraordinarily efficient smoothly functioning running machine, his mind is experiencing an unusual condition. It is to be regretted that Sir James did not describe this aspect of the runner's experience with the detail he devoted to his bodily movements.

His report that he was now unable to distinguish the heaven from the earth (Alexander 1850:263) does invite a brief glance at what is now a flourishing field of research on the effects of sustained physical exertion on the mind. (Dowson & Lewis-Williams 1994:213). A good starting point for the relationship between dance (in which sustained physical exertion occurs), and change of consciousness is Thomas(1960:127).

Noakes (1987:259) quotes the results of a survey of the psychological benefits of running as reported by a sample of 424 runners (Callen 1983). 69% Experienced the "runners' high" and 56% experienced a "trance or altered state of consciousness".

There is no reason to doubt that San hunters were subject to the same mental experiences. "The 'high' was described as a feeling of euphoria with a lifting of spirits, increased (259/260) creativity, and a sense of well being, usually occurred in the second half of the run".

Motivation of runners

The first point, which cannot be overstressed, is the motive of the runner. The frame of mind of a marathon runner, as Bruce Fordyce has pointed out to me (pers. comm.), cannot be compared with that a runner who runs simply to keep fit, nor with he/she who runs merely to achieve what is known as "runner's high". The experience of regular runners who get hooked on runner's high, does, however, support the general thesis that protracted physical exertion can result in a generally pleasant state of mind. There is no evidence that Khoisan indulged in such therapeutic fun-runs. Might there not,

however, have been a marginal similarity with the endless exhausting circular dance round the fire?

What was the shaman's motive for running down the zebra? One possibility is, as in the case of the eland, to secure its "holy" blood. It is therefore germane to remind ourselves that one of the unquestioned roles of the shaman is as healer, who bleeds from the nose and uses blood for healing purposes. The trance dance is not only a therapeutic social event, but also leads to healing laying-on-of-hands, and sneezing of blood. In certain circumstances blood is smeared on faces. The assumption has been that it is usually trance-induced human blood. It has been suggested (Butler 1997) that in many cases it is "snuff induced" human or animal blood.

But it may be useful to point to some medical research which has been done quite independently of rock art, nose-bleed and running down, into the change of consciousness induced by a controlled experiment on the healing effects of running on depressed people. In "The Psychology of Running" (Sacks 1981), dealing with the therapeutic effects of running on depressed people Greist, Klein and five others provide in "Running through your mind" a good starting point. On pages 18 and 19 they summarise the effects under nine headings. Under heading seven we learn that patients report that "running provided a reliable means of lysing (sic. losing?) symptoms of anger and anxiety, as well as depression". All subjects who ran felt some sort of "good feeling" during the run...". More important is heading eight. "Consciousness alteration ... while not available to the beginning runner, the state is described by experienced runners as a very positive, creative, less conscious, and more insightful interlude which is so addicting that many runners find it difficult to stop running even for a single day".

Mandell takes us considerably further in "The Second Wind" (Sacks 1981:211-223) where he tells us of his own changing states of mind (words in brackets and underlinings are ours):

> Thirty minutes out, something lifts, legs and arms become light and rhythmical (dance) ... The fatigue goes away and feelings of power (potency) begin ...
>
> Then, some time into the second hour comes the spooky time (hallucinations). Colours are bright and beautiful, water sparkles, clouds breathe and my body, swimming, detaches from the earth. A loving contentment invades the basement of my mind and thoughts bubble up without trails ... A cosmic view and peace are located between six and ten miles of running (Sacks 1981:211).

The state of consciousness in the shaman/hunter

Recalling the accounts of trance dancers of their states of awareness, it seems reasonable to consider hunters going through analogous neuro-psychological changes. We recall the statement of Hendrick to Alexander (1858:263), he was now "unable to distinguish the heaven from the earth". One of the attributes of this 'runners high' is a universal general benevolence.

The hunter would be filled with "loving" focussed on his quarry. There has always been this ambivalence in the hunter. He loves the thing he is pursuing to its death, because, quite apart from the gratification of runner's high, and the satisfaction of success, his quarry is usually life - giving food, he loves it as he must love his own life and that of his kin.

> In his "Meditations on Hunting" Ortega Y. Gasset makes the point that hunting (unlike violence) is never reciprocal: the hunter hunts and the hunted tries to escape. A leopard at the kill is no more violent or angry than an antelope is angry with the grass it eats. Most accounts of hunters emphasise that the act of killing is a moment of compassion and reverence: of gratitude to the animal or consenting to die (Chatwin 1987:228).

But the shaman is not an ordinary hunter. "There are many kinds of shamanistic activity. This variety was explored in "Believing and Seeing", where healing, game-control, extra-corporeal travel and rain making were described in some detail..." (Dowson & Lewis-Williams 1994:212). What follows demonstrates his control of game and his access to healing blood. It is suggested that as "runner-down" he shows his access to such potency, such magical power, that he can make his quarry give up its blood without resort to killing it.

In a hunter-gatherers' world hunted animals normally die from known, explicable, pragmatic causes, from wounds inflicted, by weapons, like Hendrick's knife, or by poisons which work to fatal effect from the inside. But the animal who has been run down acknowledges the superiority of his pursuer by voluntarily lying down and surrendering his life to him. San hunters could only ascribe such a death to the spiritual superiority or sovereignty of the pursuer. Such a death would be proof of the shaman's power. He was potent enough to master the animal sacred to his people and the blood it surrenders would have been special because no violence had been caused to the sacred beast.

THE PHYSICAL RESPONSES OF ZEBRA TO RUNNING DOWN

We turn now to the contemporary approach to such a death. It will be based on and supported by Western scientific and physiological reasoning.

People have long since domesticated equids, and used certain varieties as pack or draught animals (donkeys) or for transporting themselves. In many societies this has led to a reluctance to eat equid flesh. Their mastery was taken a stage further when his collaboration developed to the point of sport - hunting on horseback, and horse racing. With these developments came the profession of the horse doctors (now veterinary doctors) to study the horse's diet and health, and selective breeding. And one of the frequent complaints with which they were faced particularly after races, was equine nose-bleed.

The first distinction that has to be drawn is elementary. Not all nose-bleeds (epistaxis) in mammals originate, as we have been inclined to assume, in the nose.

According to Ferraro (1982:395) in race horses there are three sources of nasal haemorrhage.

1. The nasal and sinus passages

Bleeding from these areas is unrelated to exercise, is comparatively rare, and produces only small quantities of blood. There is no connection with physical exhaustion.

2. Guttural pouch haemorrhage

"The guttural pouches are large mucous sacs in the horse, which are ventral (close to the belly) diverticula of the eustachian tube situated between the base of the cranium and the atlas dorsally and the pharynx ventrally" (Dorland's Illustrated Medical Dictionary).

"Bleeding from the pouches is caused by mycotic infections, *i.e.*, infections caused by various fungi. It usually occurs during severe winters where animals are housed indoors".

The animals may suffer from incidents of nose-bleed, with large bodies of blood issuing from the nostrils. This is a serious condition, and is usually fatal. There is no connection with physical exertion (Ferraro 1982:395).

3. Pulmonary haemorrhage

Pulmonary haemorrhage is almost always induced by strenuous exercise and is most common in race horses. Until fairly recently it was assumed that the source of the bleeding in race horses was in the head, because, as in people, "any blood from the lungs was always frothy because it was mixed with air and tracheal secretions. However, it was subsequently demonstrated that, because a horse's lungs are ventral (at the same level as) the head, blood pools (gathers) in the major bronchi, and rolls down the trachea and out of the nostrils when the animals lowers its head ..." (Ferraro 1982:397). "Pulmonary bleeding does not appear as frothy blood and is not generally coughed up" and "pulmonary haemorrhage should be suspected in animals with sudden unexpected fatigue during a race" (Ferraro 1982:396).

Donaldson (1991) goes into the causes of the pulmonary bleeding with details which we do not need here. He corroborates the fact that "... in the United States more than 75% of equid athletes are reported to suffer from exercise-related haemorrhage of the respiratory tract". He also corroborates the recent acceptance of the lungs, and not the nose, as the source of the bleed. "In 1981, the term exercise-induced pulmonary haemorrhage (EIPH) was introduced" (Pasco *et al.* 1981). The acceptance of the acronym (EIPH) in veterinary circles has become general since 1981.

Pfaff (1976) gives an statistical account of nose bleeding among race horses in South Africa, which corroborates the correlation between extreme exertion and nose bleed. Pfaff (*vide* Cook 1974, Equine Veterinary Journal 6(2):45) states that "when blood appeared after the race it normally coincided with the moment when the horse lowered its head to the ground - thus supporting his contention that the blood comes from the lungs".

We are now in a position to look at the Later Stone Age zebra paintings. First, a picture of a zebra under attack. Zebra mares are normally very protective towards their foals, and this means slower running, which permits hunters to isolate them and their foals. We show a good depiction of this drama, from Zimbabwe (Fig. 2).

Garlake's caption reads, "Hunters shoot a zebra. It is surrounded by unintelligible signs, the large dots perhaps signifying blood. Unintentionally, the zebra calf next to it was not completed; two legs still had to be added. Bindura".

A different reading is possible. The zebra mare cannot run for her life, because she has a young foal. The hunters with bows and arrows are pursuing her, and have already succeeded in implanting arrows in her thigh and chest. The 'unintelligible signs' might not signify blood but two common hunters' weapons; the hard-flung fist-sized stone and the throwing stick. Little attention is paid to the foal because the hunters know it will not leave the mare. There is no nose-bleed. The elevation of her head should be noted.

This next picture (Fig. 3) of an isolated zebra provides a thought-provoking contrast.

"A zebra with lowered head, bleeding from mouth and nose. Mumurgwe." Note the posture of the front legs. They seem to be placed apart. The body leans forward as if the beast is coughing.

Our next illustration (Fig. 4) presents a further stage in the drama, if we accept that the animal is, in fact, a zebra. Woodhouse thinks it could be an antelope. The zebra has collapsed, and the stream of blood is profuse. It is being watched by a single, armed but unaggressive man, whose posture is hard to determine. It seems as though he is approaching with delicate dance-like steps.

One way of interpreting this painting is as follows. The man is the shaman hunter, waiting for the beast to die. He is in a position to kill it, but (unlike Hendrick) he does not use his weapons; neither his spear nor his bow and arrows. Yet he displays these as if to make it plain that he has not found it necessary to use them. There is certainly no evidence that he has used them on the nose-bleeding animal.

What is his state of consciousness at this moment of the death of his quarry? Hunter-gatherers inhabit an animistic world where there an absolute division between himself and animal does not exist. The categories do exist but the boundaries are vague and flexible. "It was thought that a link existed between him (the hunter) and his prey: the whole life of the animal was linked to his in this final crisis (of the kill)" (Lewis-Williams 1981:56) (words in brackets added).

Subject to the reliability of the deductions as to dating advanced by Walker (in Dowson & Lewis Williams (1994:122) it seems that the Zimbabwean hunter-gatherers may have accorded a special status to the zebra similar to that accorded by to the eland by the San in KwaZulu-Natal several centuries later. In both regions

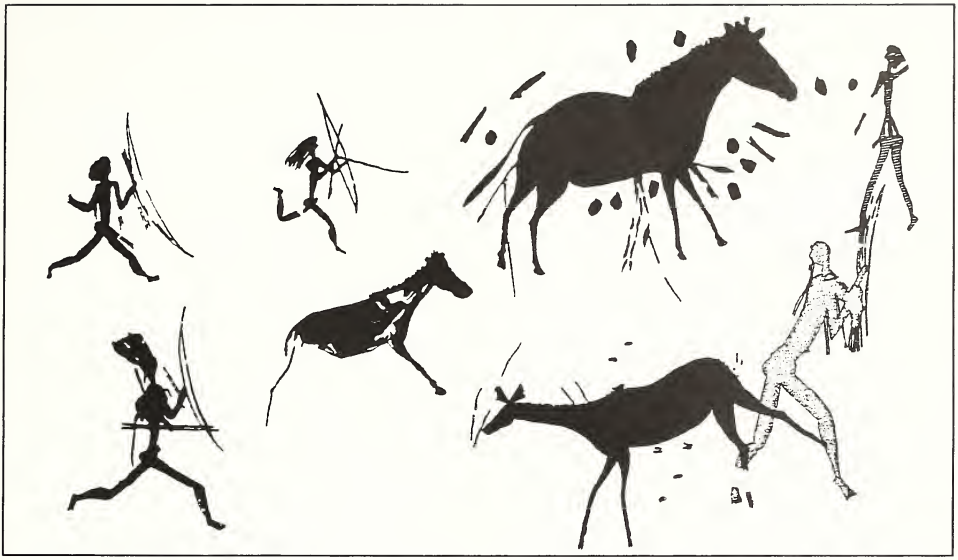

Fig. 2. Zebra under attack (after Garlake 1987).

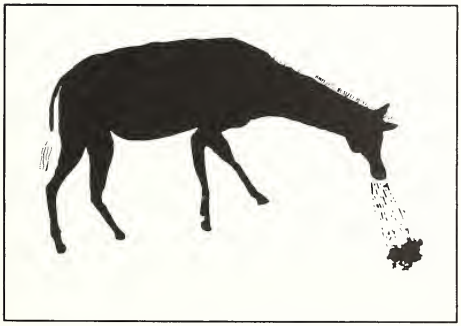

Fig. 3. Zebra with lowered head, bleeding from the nose, Mumurgwe (after Garlake 1987).

the chosen animal is frequently depicted as bleeding from the nose without evidence of any wounding of the body by weapons.

There is, however, a major difference. In the pictures of the zebra no one is near the animal. Any approach to a zebra's head would be dangerous as it is capable of biting a man's arm off. But no approach is necessary. The animal has been run to death after a long chase.

This does not apply to the eland, who is easily run to a standstill. Unlike the zebra an eland does not bite, and shamans are shown very close to their heads, in order to apply, we suggest, the substance that will cause them to bleed from the nose. Why? Because an eland driven to extremity, does not usually bleed from the nose, he may be overtaken by his pursuers before such extremity is reached. Harris (1969:35) describes what happens. "... on being pursued they presently exhibited symptoms of distress, and turning their beautiful heads, repeatedly over their plump shoulders to learn if they had not shaken off their persecutors. Finding us still at their heels, they shortly separated; their sleek coats turned first blue, and then white with froth, and foam fell in bellropes from their open mouths, and the perspiration streamed from their lusty sides".

No mention whatever of blood. But as the life of all animals is generally accepted as being in its blood, and as the sacred animal's blood is needed for healing, and also as a component of the medium of the magical paintings, bleeding must be induced (Butler 1987). No such inducement is required in the zebra.

If accepted, this proposal supports a strong case for the shaman's motives: to demonstrate his mastery over game, and to secure the sacred blood of the animal for healing and magical purposes. Also, by refraining from using any weapons of violence he proves his access to sacred potency to which the animal itself submits by surrendering its life blood.

There is such empathy, such identification that the shaman also 'dies' with his victim. It has been suggested that the way he proves this to himself and others is to smear his nose-mouth region with his victim's blood. If a group of hunters were involved, they would do likewise. It is a celebration not only of his/their part of the running down or kill, but of a blood brotherhood with each other, and their sharing of the potency which the

Fig. 4. Illustration from Spozwi, Matopos (after Lee & Woodhouse 1970).

animal exhales as it dies.

> The Kalahari San say that when an eland dies, it releases its potency and the whole place becomes embodied with power. The hunters can then harness this potency... (Lewis-Williams 1988:7).

This may throw light on an enigmatic picture (Fig. 5). The caption continues. "A conceptual relationship between these two seemingly incongruous images should be sought". Throughout this paper we have assumed that a shaman/hunter believed that there was a special, intimate relationship between him and his prey. We have argued that at one time in Zimbabwe the zebra may have been to the hunter-gatherers what the eland were to the Southern San.

If we examine the juxtaposed images in Figure 5 we observe;

The Zebra

1. The zebra is not bleeding from the mouth/nose.
2. The zebra has no weapons stuck in it or signs of bleeding.
3. The zebra is immobile. There is nothing about its legs, neck or spine to suggest movement. It could be lying down.

The Man

1. The man is lying down.
2. The man's immobility is emphasised by the unusual drawn up position of his legs. If extended, he would appear as a thin tall figure, but still recumbent.
3. The man is unarmed - neither bow and arrow or spear is near him.
4. There is a suggestion of a shoulder cloak. The hand behind the neck may suggest relaxation or even sleep.

The man has assumed a position in which he cannot

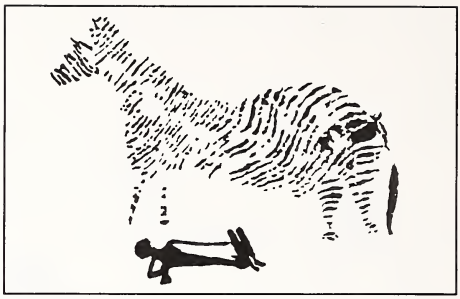

Fig. 5. A zebra juxtaposed with recumbent figure (after Garlake 1995).

run, and is weaponless. The zebra is stationary, showing no signs of flight. These passive postures in such proximity are not a depiction of any normal state. They are a shaman's vision, we suggest, of his spiritual relationship with his sacred animal.

We suggest that this is a shaman's presentation of his normal relationship with the "totem" animal.
We suggest that the zebra's legs were originally longer. In mountain zebra the stripes disappear below the knees. In the original condition this missing portion would have been painted in white, a colour known for its impermanency. The original of this would have been to relate the two figures even more intimately. Patricia Vinnicombe (pers. comm.) suggests the picture may be of a shaman "dreaming" a zebra.

Under exceptional circumstances, however, the shaman has to prove his superior potency, and the stationary relationship changes into pursuer and pursued. But no violence is used. The shaman's longer staying power makes the animal give up its life, symbolised in blood. This would have been seen in magical, spiritual terms by the hunter-gatherers, not biological or physiological as we have attempted to show.

CONCLUSION

Medical evidence supports the view that paintings of zebras bleeding from the nose, as represented in certain examples of Zimbabwean rock art, depict the final stages of the running down of a zebra.

An answer to the riddle which such pictures pose may be found on two levels:

Physical

Man has the physical stamina to pursue a zebra until its pulmonary systems breaks down, and it collapses, releasing a quantity of blood which has gathered in the guttural pouches.

Spiritual

Possibly encouraged by the changed state of

consciousness which protracted exercise may produce, shamans may have believed their stamina to be evidence of their access to superior spiritual potency. The surrender of its life blood by his quarry proves the shaman's possession of a superior potency. The possibility should be considered that blood secured without wounding the sacred animal has a special significance.

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RESULTS FROM A TEST EXCAVATION AT KLEINPOORT SHELTER IN THE, BAVIAANSKLOOF, EASTERN CAPE PROVINCE*

JOHAN BINNEMAN

Department of Archaeology, Albany Museum, Somerset Street, Grahamstown, 6139

email: amjb@giraffe.ru.ac.za

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ABSTRACT

This paper reports the results from a test excavation conducted at Kleinpoort Shelter during the early 1980s. The site yielded well-preserved botanical remains dating to the last ca 2000 years BP. A small storage pit was located at the shelter and broken arrow shafts were also found. The food and cultural remains suggest that the shelter was used by small groups for short visits during early/mid summer to exploit available patches of *Cyperus usitatus*.

INTRODUCTION

Kleinpoort Shelter is one of several small sites excavated during the early 1980s as part of a long term project to investigating hunter-gatherer and pastoralist socio-economic patterns during the Holocene Later Stone Age in the south-eastern Cape[1] mountains. The site is situated in the Baviaanskloof, a narrow valley between the Baviaanskloof and Kouga Mountain ranges (Fig. 1).

As outlined elsewhere (Binneman 1997), the most striking aspect of the archaeological scenario in the Baviaanskloof/Kouga Mountain ranges is the fact that a large number of caves and shelters contain well-preserved botanical remains. This is especialy true for the majority of small shelters in the region. However, virtually all of these deposits date mainly within the past ca 2000 years. At sites with longer sequences, only unidentifiable carbonized and/or humified remains preserved in the older deposits, which make direct comparison of subsistence patterns between deposits younger than ca 2000 and older deposits virtually impossible. For this reason the project concentrated on small shelters with well preserved botanical remains dating to the past ca 2000 years.

The sampling methods for all the sites were conducted similar those described at The Havens Cave (Binneman 1997). The detail site analysis will be published elswhere.

PRESENT DAY ENVIRONMENT

The Baviaanskloof is the second intermontane valley from the coast and runs parallel to the Langkloof (west to east) (Fig. 1.). The narrow valley is separated from the Karoo by the Baviaanskloof Mountains and by the Kouga Mountains from the Langkloof. The valley is drained by the Baviaanskloof River which joins the Kouga River at the eastern end of the valley.

The valley and surrounding mountains are composed mainly of Table Mountain quartzite with outcrops of Bokkeveld shale and Enon conglomerate in the lowlands (Rust & Illenberger 1989). The vegetation is diverse and includes fynbos, valley bushveld, renosterveld, spek-boomveld, Karoo scrubland, grassland and remnants of Knysna forest in the deeper valleys (Vlok 1989). The region experience an annual rainfall of between 200 mm and 600 mm. The temperatures can reach as high as 45° C in summer and drop well below 0° C in winter, with snow on the higher mountain peaks.

KLEINPOORT SHELTER

Kleinpoort Shelter (33.33S; 24.01E) is situated in a narrow gorge in the Baviaanskloof Mountains on the farm Kleinpoort some 8 km from Studtis (Fig. 1 & 2). A small stream separates it from another shelter on the opposite side of the gorge which also contained shallow occupational deposit. The shelter formed in a fold facing north-east. It measures 13 m along the dripline, 5 m deep and the roof is some 3 m high at the entrance (Figs 3 & 4). The surface of the deposit is about 2,0 m above the stream bed with bedrock exposed in the northern part of the shelter. The archaeological deposit was approximitely 0,40 m deep with 0,10 m of well-preserved patches of

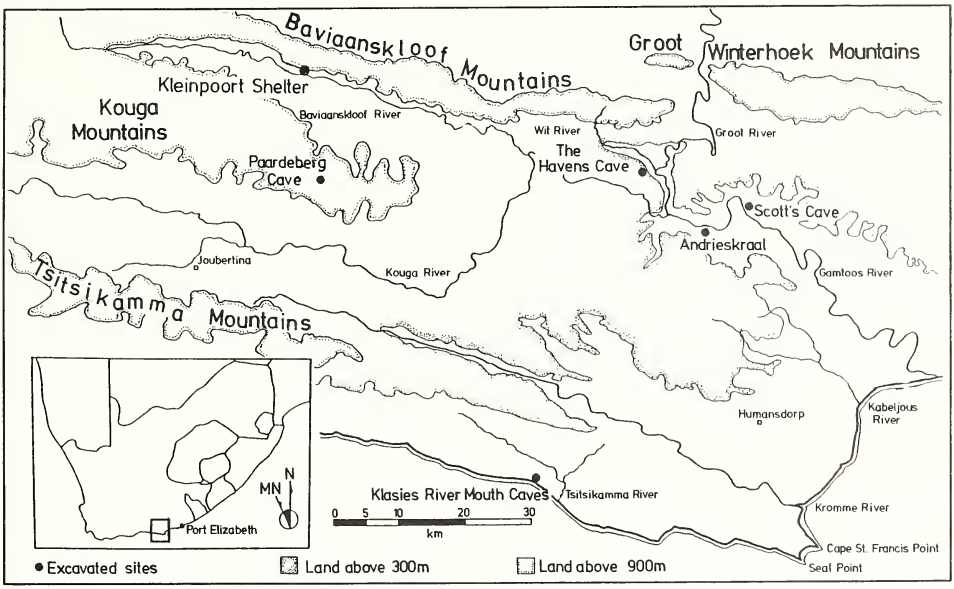

Fig. 1. Map of the south-eastern Cape and the location of Kleinpoort Shelter.

plant remains underlying the surface dust. The deposits underlying the plant unit had not been excavated, but evident from a small sampling pit were three layers of orange, brown and black ashy deposits. The site was not dated.

EXCAVATIONS

Three square metres were excavated of which a large area had been disturbed by nests of burrowing rodents (Fig. 4). A small grass lined storage pit, approximately 0,30 m in diameter and 0,15 m deep, surrounded by compacted plant remains, was located in square J10 towards the entrance of the shelter. It would appear that the pit had been emptied of its contents because it was loosely filled-in with a variety of food waste and cultural material. *Cyperus usitatus* corm tunics were prominent remains in the pit.

The remainder of the square consisted of grey ashy deposits and botanical remains, which represented disturbed soils from rodent burrows in the adjoining square (J11). Most of this square had been disturbed by burrowing. Square J12 consisted of patches and circular hollows of compacted plant material surrounded by soft, sandy loose grey soils mixed with plant material. Next to one of these plant filled hollows, a broken arrow shaft and several fragments of reed were located. A second, smaller, grass-lined storage pit, was also found in J12.

Although the cultural and faunal samples from Kleinpoort Shelter were small, and provided limited information, the botanical remains provided sufficient information to gain some insights into the subsistence strategies during the past ca 2000 years.

SUBSISTENCE AND DIET

Botanical remains

In general a similar range of plant remains were recovered from Kleinpoort Shelter as reported from The Havens Cave (Binneman 1997, table 1). The bulk of the botanical remains analysed consisted of grasses, sticks, twigs and bark. The most common grass identified from the inflorescence was *Themeda triandra* ("rooigras"/red grass) which flowers between September and December (Chippendale 1955).

Cyperus usitatus ("Boesmanuintjie") accounted for the bulk of the underground plant foods. The bulbs are edible and Burchell (1824) observed Bushmen collecting these bulbs, and roasting them slightly before eating them. These bulbs are also eaten by children and adults in Lesotho (Aston 1939), but causes constipation if taken to excess. The bulbs can also be ground to meal and cooked as porridge in time of famine (Jacot-Guillarmod 1971: 422). According to Sparrman (1785) and Barrow (1806), *C. usitatus* played an important role in the social and economic life of the Khoekhoen. Important time events were measured by these plants. Their New Year, age and other events were marked by the appearance of the plants as well as the time of gathering, known as "uintjiestyd".

Small quantities of other geophytes, such as *Watsonia* sp., *Moraea* sp., *Freezia/Tritonia* sp. and *Hypoxis* sp. were were also recorded.

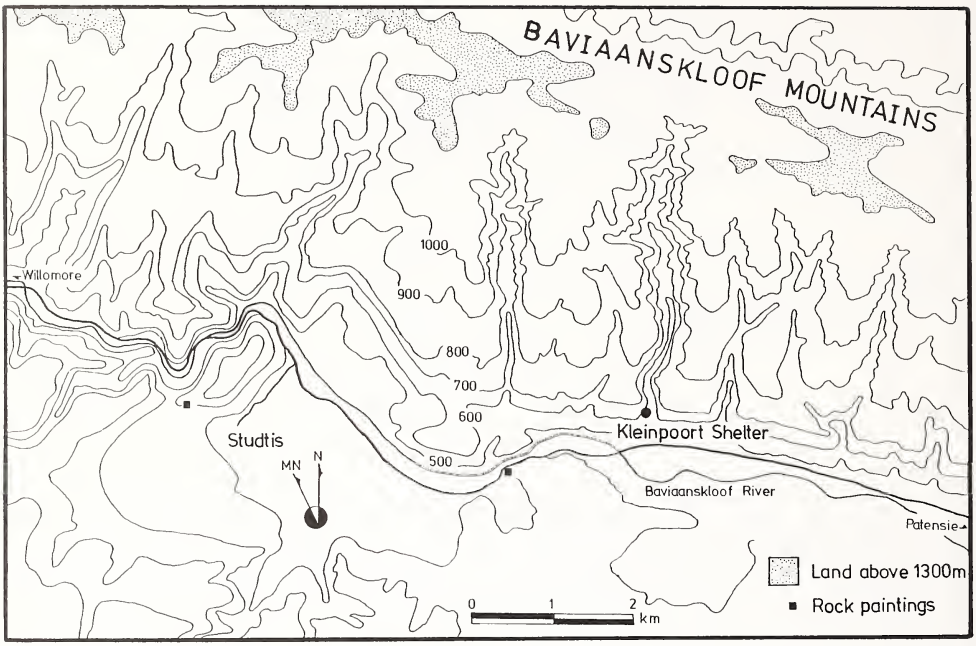

Fig. 2. Location of Kleinpoort Shelter.

Fig. 3. View of Kleinpoort Shelter.

Schotia sp. (Karoo boer-bean) pods were well-represented in all the samples and must have been an important food resource. Only pod fragments were recovered and it is not known whether both or only one species were present. *S. afra* var. *afra* is edible and available between October and March (Coats Palgraves 1977:275). Wikar (1779) reported that the Bushmen near the Augrabies Falls cooked the beans of *S. afra* var. *angustifolia* so that the outer red skin could be peeled off, because the skin is somewhat astringent. They also roasted the beans under the coals and pounded them into meal, which they cooked. Wikar also mentions that the beans tasted pleasant when eaten green. Xhosa eat the seeds when still partly green, or roast the mature seeds in the fire and grind them into meal. The early European settlers also ate the beans (Watt & Breyer-Brandwijk 1962:645). *S. latifolia* pods are available between April and August (Coates Palgrave 1977:277) and are used in a similar manner as *S. afra* (Watt & Breyer-Brandwijk 1962:646).

Other edible plants included *Dioscorea elephantipes* ('hottentots bread') and *Carpobrotus edilus* ('hottentots fig'). *D. elephantipes,* also known as elephant's foot, was eaten by Khoekhoen. They cut the inner white flesh of the tuber into strips which were eaten after being roasted on the coals (Smith 1966).

Most of the seed remains found at Kleinpoort Shelter were also present at The Havens Cave. The most abundant seed remains recovered were *Pappea capensis* and *Rhus* sp. Many of the *Rhus* sp. seeds still had the outer skin attached to them, which may suggest that the deposits are not of great antiquity. The only new seed remains were *Acacia karoo* Hayne (sweet thorn) *Sideroxylon inerme* and *Grewia robusta* (karoo cross berry).

A few *Opuntia ficusindica* seeds (prickly pear) were also recovered from J12. *O. ficusindica* originated from Central Mexico and had already reached pest status in the Eastern Cape Province by 1750 (Stirton 1978:112). The

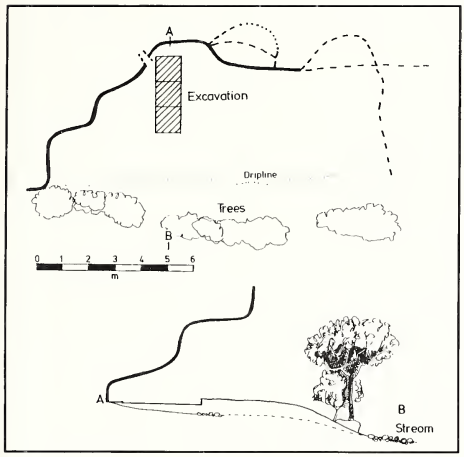

Fig. 4. Plan and excavation at Kleinpoort Shelter.

fact that the seeds were not present in the bulk samples, but found in the loose plant rich deposits towards the rear of the shelter, suggests that they were introduced to the site in recent times by baboons or humans.

The *A. karroo* seeds probably entered the shelter with the fire wood (it is known to be an excellent fuel). However, the remains may also suggest other uses for this tree. The gum of the *A. karroo* tree is edible and can be used as an adhesive (mastic?). The bark makes good rope and can also be used for tanning. The pods are avalible from January onwards (Coates Palgrave 1977:241). Not much is known of *G. robusta*, but the fruits mature between March and August (Coates Palgreave 1977:579).

Among the medicinal plants recovered were *Boophone disticha* and *Gasteria* sp. *B. disticha* is probably the most widely used medicinal plant among indigenous people in the Eastern Cape. Thunberg (1795) reported that the Bushmen and Khoekoen used the inner leaves as a source of poison for their arrows. The Xhosa use the dry leaves as a dressing after circumcision and to treat boils.

The use and economic value of *Gasteria* sp. is unknown among the Khoesan people, but some Bantu-speakers use the plant to treat paralysis and eat the leaves as protection against anthrax infected meat (Watt & Breyer-Brandwijk 1966:700).

Faunal remains

The mammal remains consisted mainly of small animals such as dassie, mole, hare, klipspringer and grysbuck, suggesting a trapping/snaring rather than a hunting strategy (Tabel 2).

The only other food remains recovered were a few fragments of tortoise, other reptile (possibly snake), bird, freshwater mussel and a few marine shell (possibly *Perna perna*).

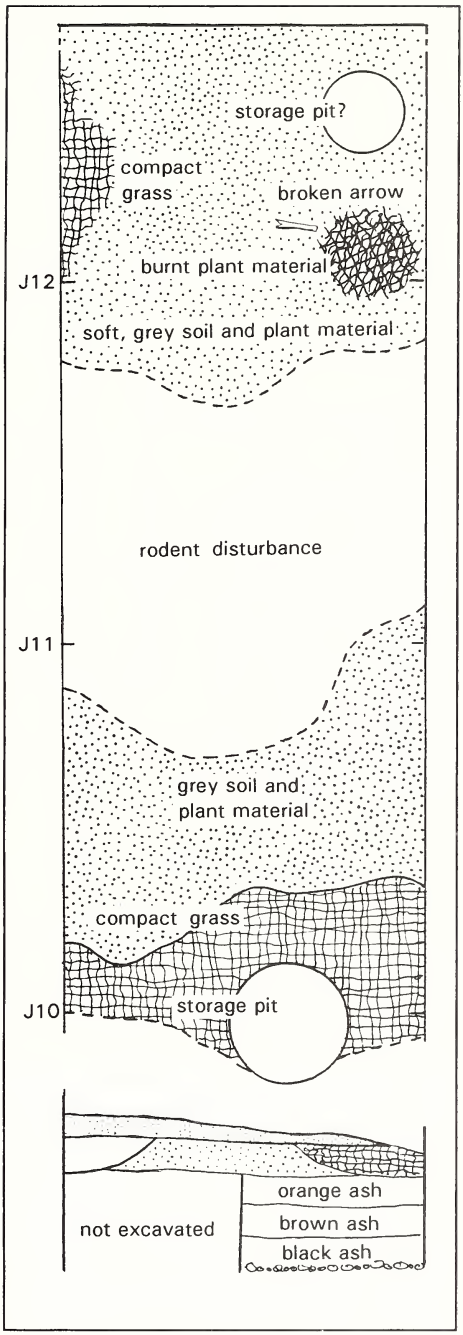

Fig. 5. Plan and section drawings of the excavations.

Table 1. Analysis of bulk samples of plant remains from Kleinpoort Shelter.

	Storage pit	Bedding		Storage pit	Bedding
WEIGHT			**SEEDS AND FRUITS**		
Unsieved	926,2g.	6326,2g	*Schotia* sp.pods	6,0	12.6
1mm mesh	344,4g.	1402,6g	*Pappea capensis*	5,7	13,4
3mm mesh	272,1g.	991,7g	*Grewia occidentalis*	-	0,2
			Diospyros sp.	0,3	*
NON BOTANICAL			*Rhus* sp.	0,4	1,8
Waste stone	72,2	270,5	*Cissampelos capensis*	*	*
Stone tools	1,5	12,5	*Acacia karoo*		
Pottery	-	1,0	pods	0,1	-
Marine shell	0,1	-			
Bone	1,2	5,6	**EDIBLE AND MEDICINAL**		
Bone tools	-	0,3	*Cyperus usitatus*	11,7	20,6
Hide and hair	*	-	*Freezia* sp.		
Insects	0,3	0,8	corm tunics	-	*
Earth lumps	2,2	-	*Hypoxis* sp.		
			contractile roots	0,7	0,3
PROCESSED PLANT MATERIAL			*Boophone disticha*	-	0,6
REEDS	0,3	-	*Dioscorea elephantipes*	1,0	6,6
			Carpobrotus edulis	-	2,3
CYPERUS TEXTILIS	0,5	0,4	*Gasteria* sp.	2,8	5,9
Cordage	-	0,3			
Matting	0,2	-	**LEAVES**	3,1	3,8
WOODEN ARTEFACTS			**OTHER INCLUSIONS**		
Shavings	1,3	3,7	Charcoal	11,4	25,8
			Twigs and bark	36,4	46,2
GRASSES			Thorns	*	-
Lining	28,8	-	Moss	*	-
Stems and bases	0,3	16,7	Misc. unidentified	4,5	1,1
INFLORECENCES			**BOTANICAL ARTEFACTS**		
Themeda triandra	*	*	Tied plant bunches	-	2,7

* Present

CULTURAL MATERIAL

Lithic artefacts

Apart from one utilized chalcedony flake and a relatively high number of quartzite flakes (91) no formal tools were found (Table 3). Surprisingly no ochre was recovered from the site either.

Non-lithic artefacts

Botanical artefacts

A small number of botanical artefacts were recovered from the excavation (Table 4). This included cordage and matting made from *Cyperus textilis*, worked wood, wood shavings, a wooden linkshaft, arrow shafts, bone awl and seed beads (Figs 5 & 6).

The two reed arrow shafts were an interesting find, because only a few portions of arrows have been reported from southern Africa (Clark & Walton 1962; Parkington & Poggenpoel 1971; Cooke 1974; Deacon 1976; Wadley 1979; Mazel 1992). An almost complete arrow shaft and three snapped shafts were reported from Faraoskop Rock Shelter in the Western Cape Province (Manhire 1993).

The two broken arrow shafts from Kleinpoort Shelter probably represent the same arrow (Fig. 5). Both pieces are approximitely 17 cm long and broken at the one end. One shaft is notched at the proximal end and the other has a neatly prepared (ring-cut) socket for a linkshaft at the distal end. There is a black residue around the socket with fine line imprints, which indicate that it carried binding of some sort.

Several other pieces of reed with cut marks were also recovered. Wooden artefacts included a linkshaft, well-preserved fire stick, wood fragment with cut marks and wood shavings. The wooden linkshaft (Fig. 5) found in J11 fits the socket of the arrow shaft, but may not have been part of that specific arrow.

Six *Hypodiscus aristatus* seed beads were recovered. A similar bead was found at The Havens Cave (Binneman 1997) and subsequently many more were found at other sites in the region. It would appear that this seed bead is restricted to the Baviaanskloof/Kouga region because it has not been recorded elsewhere.

A peculiar find were six flat, round wads of fine grass and other plant material. The use of these artefacts is not known.

Table 2. Preliminary count of faunal species from Kleinpoort Shelter.

MAMMALS	
Cynictus penicillata	3
Procavia capensis	7
Raphicerus melanotis	2
Oreotragus oreotragus	1
Bathyergus sullius	2
Lepus sp.	1
Bovidae - general	
small medium	1
large medium	1
Total	**18**
REPTILES (tortoise)	*
Other reptiles	*
BIRD	*
MARINE SHELL	
Tricolia capensis	1
Total	**1**
FRESHWATER SHELL	
Unio caffer	1

* Present

Table 3. Frequencies of stone artefacts.

WASTE	
Chips	
Quartz	9
Quartzite	92
Chunks	
Quartzite	2
Cobble cores	2+
Flakes	
Quartz	2
Quartzite	91
Total	**198**
UTILISED	
Flakes	
Silcrete	1
Total	**1**

+ Ochre stained

Bone and shell artefacts

Few bone and shell artefacts were recovered (Table 4). These included a bone awl, a pendant made from tortiose shell, three ostrich eggshell beads and two *Nassarius kraussiana* beads.

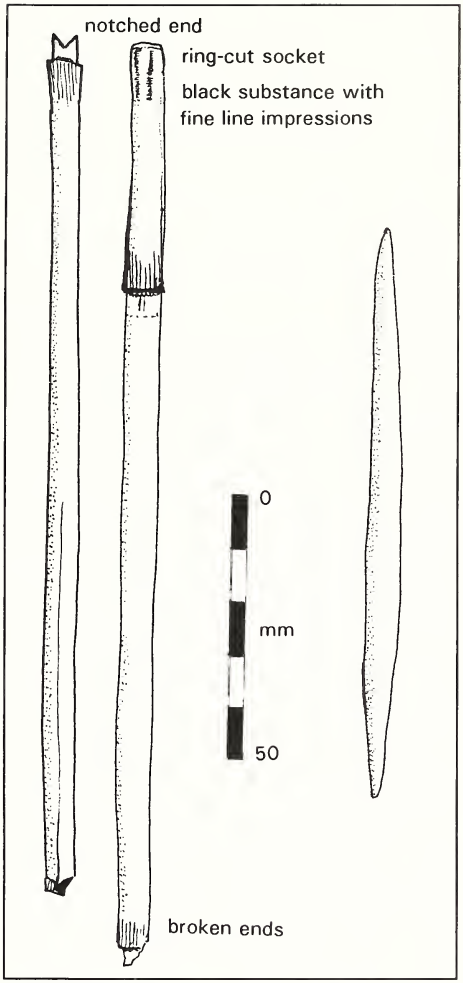

Fig. 5. Broken reed arrow shafts and wooden link shaft.

Fig. 6. Broken arrow shaft.

Table 4. Frequencies of pottery and botanical artefacts.

POTTERY	
Fragments	16
Rim	1
Lugs	1
Total	**18**
WOOD	
Linkshafts	1
Fire drills	
male	1
Cut pieces	1
Shavings	*
Total	**3**
REED	
Arrowshafts	2
Cut/notched	1
Total	**3**
CYPERUS TEXTILIS	
Cordage	3
Matting	5
Cut/slit	10
Total	**18**
SEED BEADS	
H. aristatus	6
OTHER ARTEFACTS	
Plant bunches	6
OTHER INCLUSIONS	
Mastic	1
Glass beads	1
Total	**2**

Pottery

Eighteen pieces of pottery were found which included a rim piece and a lug.

Other artefacts

A single green glass bead was found which may have been introduced to the shelter in historic times.

DISCUSSION

The botanical remains recovered from Klein Poort shelter, especially the relatively large quantity of *C. usitatus*, suggests that the site was occupied for short periods of time, possibly by small family size groups. These stays coincided with the availability of *C. usitatus* during the warmer months of the year.

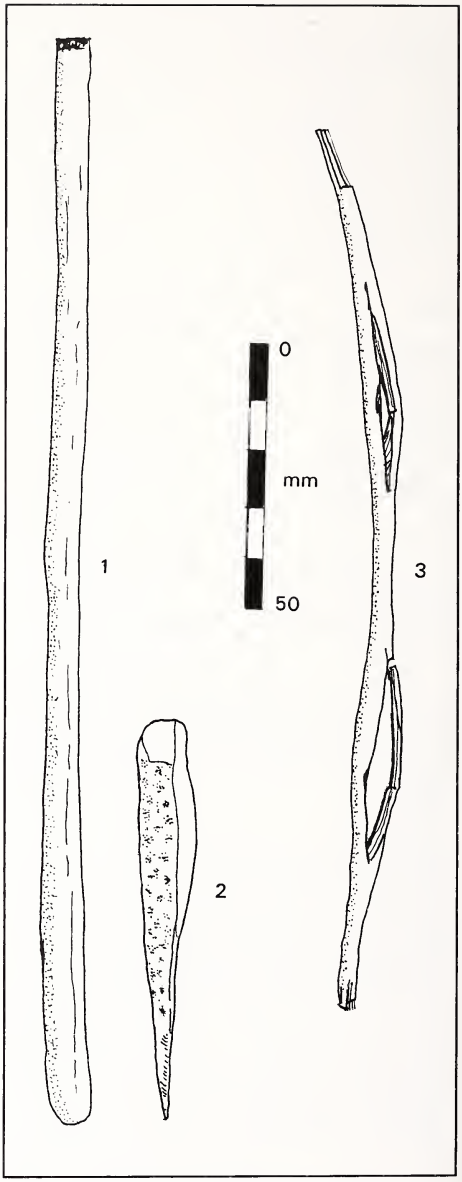

Fig. 8. 1, fire stick; 2, bone awl; 3, split *C. textilis*.

The relatively few small mammals captured and material culture remains found at the site, together with the absence of items such as formal stone tools, shell ornaments and unfinished OES beads also support this assumption. The broken arrow shafts and wood shavings

indicate that certain manufacturing and maintenance activities of equipment took place at the site during the short visits. This suggests that the shelter was most probably a base camp for small family groups during the dispersal phase or hunting parties when they visited the valley floor.

It may be speculated that Kleinpoort Shelter and other small shelters with similar occupational deposits in the Baviaanskloof valley indicate that hunter-gatherer groups became smaller and more mobile during the past ca 2000 years, at least at certain times of the year. This enabled relatively small groups to target and utilized patches of small food parcles such as *C. usitatus* for longer periods and more effectively than would be the case with large groups. The reason for this is not clear, but it may be related to greater pressure on existing resources due to a re-arrangement of populations in the south-western Cape, which took place with the settlement of the Khoekoen pastoralists in the region ca 1800 BP (Binneman 1996).

Endnote

1. Cape St Francis/Tsitsikamma coast and the adjacent Kouga/Baviaanskloof Mountain complex.

ACKNOWLEDGEMENTS

I am grateful to the Albany Museum for its support towards this research project. I would like to thank Mr M. du Preez for permission to excavate Kleinpoort Shelter. I am indebted to Mrs Estelle Brink and the late Dr Amie Jacott-Guillarmod for the identification of the plant remains. I also would like to thank Mr James Brink for the faunal analysis and Mr Cecil Nonqane for his assistence during the project.

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SHORT ARTICLES

THE COMPOSITIONAL RELATIONSHIP BETWEEN POTTERY AND ITS SOURCE CLAY PART 1: AN EXAMPLE FROM THE WORK OF A TRADITIONAL POTTER ON THE FARM NONNASHOEK, BETHLEHEM, FREE STATE*

L. JACOBSON

McGregor Museum, P.O. Box 316, Kimberley, 8300

W.A. VAN DER WESTHUIZEN

Geology Department, University of the OFS, P.O. Box 339, Bloemfontein, 9300

J. DREYER

National Museum, P.O. Box 266, Bloemfontein, 9300

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ABSTRACT

Chemical data for a small number of potsherds and the clays from which they were made is presented. The sherds closely resemble the clays in composition, and although the sherds came from unused vessels, it does satisfy the assumption made in provenance studies that clays and their fired products can be chemically matched.

INTRODUCTION

A basic assumption of pottery provenance studies assumes a close relationship between a clay source and ceramics made from that source such that the two can be uniquely related. This, however, can and has been challenged as there are a number of processes in the sequence from a raw clay to the archaeological sherd which could alter the original chemical signature such that the two are no longer recognisably the same (Arnold *et al.* 1991, Neff *et al*, 1988, 1989). These include the preparation of the clay, the usage of the vessel and the effects of being discarded and buried after use. The paper will present data which shows that, under certain specific conditions and stages in this process, a fired vessel can be directly and unambiguously linked to its source clay.

THE SAMPLES

The samples for analysis were collected from Mrs Evelina Mokoena of the farm Nonnashoek in the Bethlehem District, who at the time was making pottery using traditional methods (Dreyer 1988) (Fig 1). The potter used two types of clay, one a blackish clay from the nearby vlei, the other a whitish clay from a road cutting through a ridge near the house (referred to in Dreyer 1988) as "rooi klei" or red clay: when seen in situ this clay was yellow but subsequently dried white). A number of vessels, including a few broken fragments as well as clay samples, had been collected and it was from these that specimens were made available for analysis. Both types of clay were analyzed as well as fragments from the broken but unused vessels. It was not known from which clay the sherds had been made.

A brief description of the manufacturing process is necessary as this could have a material effect on the original clay compositional profile. Once collected, the clay was processed by breaking up the lumps with a grindstone and ground into a fine powder from which all stones and grit were removed. Temper, in the form of finely ground potsherds, was added in order to give strength to the vessel and prevent it from exploding during the firing process. Water was then added and the

1a

1b

Fig. 1a. Mrs Mokoena shaping a pot using traditional methods; b, example of pots made by Mrs Mokoena.

clay thoroughly mixed and left for a while to 'ripen'. The vessel was then formed in a cool place out of the wind and finally left to dry out thoroughly before firing which took place in a hollow in the ground.

It is important to note that clay is not often found 'clean', *i.e.*, without any stones or grit or other impurities. These may be removed by hand, but they will always form a small fraction of the total composition depending upon how thoroughly the cleaning is carried out during the preparation. These natural inclusions could have an influence on the chemical profile of the total vessel if their composition is widely divergent from the clay. In itself, this does not really matter as, being a natural component of the clay deposit, they form part of the clay's chemical fingerprint. Where it could matter is if this material is not evenly distributed throughout a clay body or if different potters prepared the same raw clay on an individual basis with regards their own assessment of what was an acceptable amount of natural impurities in clay.

METHODOLOGY

X-ray fluorescence was chosen for the analysis (Jacobson *et al.* 1994) and a Phillips PW 1404 XRF apparatus was used. All samples were prepared according to the method of Norrish & Hutton (1967). This consists of initially grinding the sherds to a fine powder at -300 mesh; a 10 gram sample is then pressed into a powder briquette, bound with Mowiol and a boric acid backing for the analysis of trace elements and Na_2O. The rest of the powder is heated to 110°C for a minimum of 12 hours in order to determine moisture content (H_2O-) by weight loss. The sample is then heated to 1000^0 C for three hours to similarly determine loss on ignition (LOI) of all organic material, C, CO_2 and crystalline water. The sample is then combined with Spectroflux 105 and melted to form a glass bead for which the major elements are determined (in oxides as weight percent). International geological standards were used for calibration.

RESULTS

Table 1 presents the results of the analysis. Major elements are presented as oxides in weight per cent whilst traces are in parts per million (ppm). To compare major elements, they need to be normalised to 100 % after H_2O- and LOI are removed. Note how the samples fall into two very clearly defined chemical groups, each consisting of a clay and two or three sherds (for the white and black clays respectively). The white clay is enriched in SiO_2, TiO_2 and Zr, whilst depleted relative to the black clay in most of the other elements although a few, *e.g.*, Nb and V, show little difference between groups. The origins of the difference must lie either in the source rocks from which these clays were developed or else mixing or winnowing or some other process such as inclusion of organic material (see below) during the formation of the deposits. The local area is underlain by sandstone, shale and basalt exposures from various Karoo Sequence formations any of which could contribute to the observed differences.

The sherds follow the clay results closely enough for them to be assigned to one or the other. The only exceptions appear to be Cr and Co which are slightly enriched in the black clay relative to its sherds and Zr, which is enriched in the sherds relative to the black clay. The overall differences between the white and black clays and their sherds are obvious but more samples are needed before definite conclusions can be reached for some of the apparent differences between the clays and their sherds are obviously but more samples are needed before definite conclusions can be reached for some of the apparent differences between the clays and the sherds.

CONCLUSIONS

From this, there are two obvious conclusions. Firstly, the sherds closely resemble the clays from which they were made. Note, however, that the sherds had never been used or discarded and buried and thus two critical steps

Table 1. Data for the five potsherds and two clays. Base, rim and body refer to the type of sherd analyzed; "bc" is the black clay and "wc" the white clay. Major elements as oxides in weight per cent, traces as ppm. See text for further details.

	bc 8	base 0	rim 4	body 7	wc 9	base 5	body 6
SiO_2	67.00	76.27	74.74	73.39	76.81	81.04	80.62
TiO_2	0.44	0.54	0.58	0.58	0.67	0.71	0.72
Al_2O_3	13.78	13.78	14.37	14.96	10.99	11.23	11.68
Fe_2O_3	6.24	5.29	5.55	5.71	3.39	3.76	3.98
MnO	0.02	0.02	0.03	0.01	0.01	0.01	0.01
MgO	0.54	0.57	0.60	0.61	0.28	0.28	0.28
CaO	0.54	0.46	0.51	0.52	0.25	0.25	0.27
Na_2O	0.12	0.23	0.18	0.21	0.04	0.00	0.00
K_2O	1.51	1.82	1.86	1.86	1.40	1.52	1.54
P_2O_5	0.03	0.04	0.04	0.03	0.03	0.03	0.03
H_2O-	3.70	0.21	0.26	0.66	1.88	0.29	0.27
LOI	6.57	0.79	1.97	1.67	3.93	0.65	0.85
TOTAL	100.49	100.02	100.69	100.21	99.68	99.77	100.25
Rb	116	119	119	127	81	88	88
Sr	72	71	73	76	45	49	49
Y	32	36	37	38	26	30	31
Zr	195	243	253	261	358	381	390
Nb	7	10	10	11	11	13	13

in the sequence from a raw clay to the archaeological sherd which could change or contaminate the original chemical signature (*e.g* , Freestone *et al.* 1985) are missing. Although some temper had been added to the clay, this had obviously had very little effect on the overall composition. This could either be due to the temper having the same composition as the clay or because not enough was added to materially alter the composition. The influence of temper on the clay composition is currently being investigated (by L.J. & W. vd W) and will be reported on elsewhere. Suffice to say that it requires the addition of approximately 10-20% temper to make a significant difference to the compositional profile of clay depending, most importantly, upon the relative values of the elements being measured (Neff *et al.* 1988, 1989), a temper with a profile similar to the clay having no effect. These results, however, do show that the firing process has no effect on the composition of these vessels.

The second point relates to interpretation. As demonstrated here, one needs to be cautious when interpreting the chemical variability of pottery from any one site in terms of trade or exchange before the geochemical variability of the local clays and substrate is understood. This is easier said than done as knowledge of clay sources near most archaeological sites is totally lacking particularly from a potter's perspective. As traditional pottery making is still carried out in parts of South Africa, it is imperative that studies be undertaken of the entire pottery making process from both an ethno-archaeological as well as a geochemical perspective in order to complement future provenance studies and before this knowledge is lost forever. In the meantime, archaeologists can assist by consulting local communities about pot making traditions, collecting vessels and sherds in current use as well as taking a selection of clay samples from the vicinity of their sites (even if chosen on geological grounds only). These can then be curated with the excavated site materials until needed.

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A NEW GEOMETRIC PAINTED SITE FROM ZAMBIA*

LAWRENCE BARHAM

Department of Archaeology, University of Bristol,
55 Woodland Road, Bristol, BS8 UK

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ABSTRACT

In July 1994 a painted cliff face was discovered at Lubungu Pontoon in the North-Western Province of Zambia (Fig. 1a). The circular and linear painted markings found at Lubungu Pontoon are attributed to a widespread tradition of geometric rock art made by foragers in the miombo (Brachystegia) woodlands of south-central Africa. The Lubungu Pontoon paintings are the first to be reported from the Kasempa District of Zambia and extend the known distribution of this art style.

THE SITE

The Lubungu Pontoon crosses the Kafue River on the road to Kasempa from Mumbwa and marks the boundary between the Central and North-Western Provinces (Fig. 1b). Dominating the local landscape is a linear range of unnamed sandstone hills that are breached by the confluence of the Kafue and its tributary the Lunga River (Fig. 1c). At this point, the hills reach a maximum height of 1189 m, and it was here on a south-easterly facing cliff (26.26.30E; 14.34.28S) that the paintings were discovered.

The paintings are approached by a steep climb to where the slope breaks to form a vertical cliff face. The cliff rises 4 m from a boulder-strewn floor before breaking into an uneven and heavily eroded crest. The face extends horizontally for 9 m and is framed between two irregular projections (Fig. 2) which create a natural gallery with a commanding view. The ground surface abutting the base of the cliff forms a level platform only 2-3 m wide and then drops away steeply. The paintings are found on the smoothest surfaces of the rock face but erosion by exfoliation has created gaps in the distribution of the art making it difficult to estimate its original extent. The main body of paintings covers an area 4.5 m wide by 2.5 m high in the centre of the outcrop (Fig. 3) with isolated patches of images occurring to either side.

A white calcium carbonate film of varying thickness covers the images and both protects and obscures them (Fig. 4). The source of the film appears to be a seasonal cascade of water down the cliff face from channels above. The carbonate layer indicates that the paintings are not recent, but the rate of accumulation is unknown and the age of the underlying art could range from hundreds to thousands of years. The exfoliated surfaces of the rock face are largely free of a film covering,

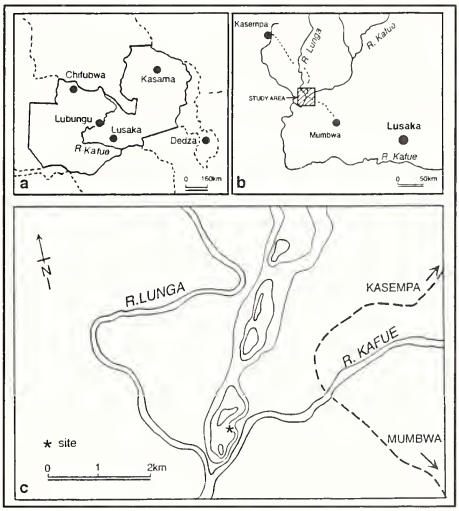

Fig. 1a. Location of Lubungu Pontoon in relation to rock art sites in Zambia and Malawi mentioned in the text; 1b: the study area at the confluence of the Lunga and Kafue Rivers; 1c: Lubungu Pontoon is situated at the southern end of a range of hills and overlooks the Kafue River.

whereas many of the images are almost invisible beneath a white carbonate crust. This basic observation supports the inference that at the very least the paintings are not recent. Direct AMS radiocarbon dating of the carbonate film would provide a minimum age for the paintings; a date which could then be compared to dates on any painted fragments which might be recovered from

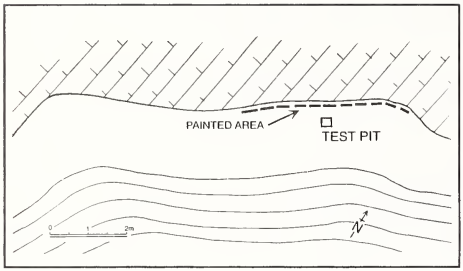

Fig. 2. The location of the paintings in relation to the cliff face and the steeply sloping ground surface. A small test pit was excavated near the base of the paintings.

excavations at the foot of the panel. These objectives will form part of a programme of survey and excavation in the Lubungu hills planned for 1999-2000.

THE IMAGES

A comprehensive statistical analysis of the main panel cannot be made, owing in part to the extent of the carbonate film. Of the clearly visible images, the most common forms are vertical finger width strokes, in groups of four or five, of varying lengths from 50-100 mm, some crossing at 90^0 to form grids. Less common, but distinctive elements are inverted U shapes bisected by a single line forming a trident (Figs 5 & 6a, b). These range in size from 160-60 mm and are painted in finger width lines. More unusual are two lowercase letter b shapes, also in finger width lines (Figs 4 & 6c). No iconic images of animals or humans were discovered. The carbonate film not only obscures much of the imagery but also alters the apparent colour of the pigment. All the paintings beneath the film appear to be bluish grey but in reality are reddish brown. This masking effect of the film is evident where an image is only partially covered then the contrast between grey tint and brown pigment becomes clear (Fig. 4). Black and white images are absent, but the white film may be transforming black pigment into bluish grey and may make white pigment indistinguishable from the calcium carbonate covering. These provisos aside, the Lubungu images can be summarised as a combination of geometric and linear forms painted in red finger width lines.

COMPARISONS

The Lubungu paintings are part of a widespread central African tradition of 'schematic' art (Clark 1959; Willcox 1984) found north of the Zambesi across the former range of miombo woodland, and which is generally attributed to foragers (Clark 1959; Smith 1995) or to early farmers (Phillipson 1972). In Zambia, red geometric and linear images emphasising circles and half circles are found in the Eastern Province (Phillipson 1976) and in the Kasama District to the north (Smith

Fig. 3. Photograph showing the height of the cliff face, the extensive carbonate film covering and the location of the 'b' shaped image illustrated in Figs 4 & 6c.

1995, 1997). The region nearest to Lubungu, the Central Province, is distinguished by more linear imagery with the inclusion of white pigment as filler between the lines (Smith 1995). The Lubungu panel incorporates the linear features of the Central Province with a variation of the half circle imagery, which is widespread further east in Zambia and Malawi. The closest stylistic links are found in the North-Western Province of Zambia at Chifubwa Stream Shelter (Fig. 1a) near Solwezi on the Congo (formerly Zaire) border (Clark 1958).

The Chifubwa images are engravings, though some are painted red, which resemble closely the inverted and bisected U shapes of Lubungu. The Chifubwa engravings are covered by Late Stone Age deposits (Clark 1958) which Miller (1969) classifies as Nachikufan I based on its high frequencies of backed bladelets and segments. The main occupation of the shelter is associated with the lowermost red sand deposits, which also contain abundant red pigment. The engravings begin just 450 mm (18 inches) above this deposit and an engraved boulder was rooted in the red sand. A single radiocarbon date based on a composite sample of charcoal from the overlying orange sand stratum provides a minimum age of 6310 ± 250 BP (Miller 1969) for the main occupation and presumably for the engravings. (The source of the

Fig. 4. Photograph of two painted forms, a b and a trident-like image (see Figs 6b, c).

Fig. 5. Photograph of elongated inverted and bisected U shaped painting.

charcoal and its relevance to the paintings has been questioned because of the possibility that it was introduced into the shelter by flooding from the nearby stream (Smith pers. comm.) Given the close similarities in style, the Lubungu Pontoon paintings could conceivably be older than 6000 years, but a chronology based on a single indirect date, ambiguous stratigraphic associations and assumptions about stylistic uniformity is inherently risky. The direct dating of the Lubungu carbonate film would test this linkage of paintings with engravings based on style.

A relative chronology for the art of central Africa was constructed by Clark (1959) with regional refinements made by Phillipson (1976) and more recently a synthesis for south central Africa has been proposed by Smith (1995) based on research in the Kasama District of northern Zambia and the Dedza District of Malawi (Fig. 1a). Smith's scheme combines superimpositioning, archaeological data and oral traditions to discern five groupings or temporal phases of paintings, each defined by a common set of images and use of colour. Phases 3-5 are the most recent with a mix of animal and human

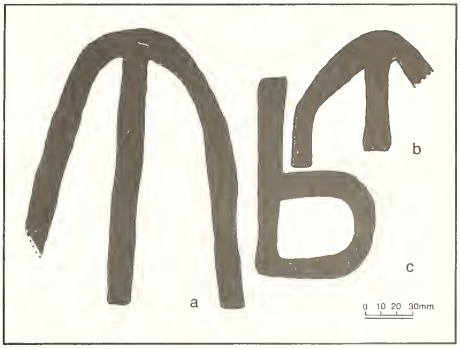

Fig. 6. The most distinctive images at Lubungu Pontoon include inverted and bisected half circles or ovates (a, b) and a b shape (c), all painted in red.

images, extensive use of black or white pigments and close links with contemporary masked rituals linked to rites of passage. These images overlay red geometric and linear finger painted images (Phase 2) and red animal and human images painted by brush (Phase 1) (Smith 1995). Phase 1 sites are few in number, except in the Kasama District, and are rarely found with the imagery of Phase 2.

These two earliest traditions or phases are attributed to forager groups (Smith 1995, 1997) partly on the consistency of superimpositioning of white imagery (=agriculturists) over the red phases and partly on ethnohistory. This pattern occurs in other parts of central and southern Africa where the 'Late White' (Willcox 1984) tradition is associated with Bantu-speaking peoples, whereas oral tradition and historical accounts attribute red geometric and zoomorphic paintings to hunter-gatherers (Prins & Hall 1994:173-4). Smith (1995, 1997) draws parallels between the geometric patterns of modern Pygmy art with the geometric and linear imagery of Phase 2 pictographs. The bisected half circles and b shaped forms at Lubungu have direct counterparts in some Mbuti images painted by women on bodies and bark cloth (Meurant & Thompson 1995: plates X-XIV). This is not to say that all central African geometric art was the work of Pygmies or painted in the same social contexts, only that they provide the nearest modern analogues. The Bushman art of southern Africa with its abundant use of human and animal imagery (Lewis-Williams 1983) differs markedly from Phase 2 geometric art as does the Sandawe rock art of central Tanzania which more closely resembles that of southern Africa (Ten Raa 1971; Lewis-Williams 1987).

At Lubungu Pontoon, the link with foragers is strengthened by the absence of pottery on the adjacent land surface and by the presence of stone artefacts just beneath the topsoil. A small test pit measuring 400 x 400 mm was excavated to a depth of 200 mm into the strip of level ground near the painted panel (Fig. 2). A stick of

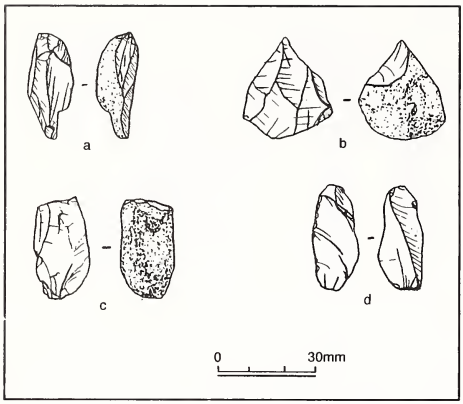

Fig. 7. Stone artefacts found in the test pit include bipolar core fragments (a & c), a borer (b) and a bladelet (d). All are quartz except (d) which is quartzite.

charcoal and six stone artefacts were recovered including two quartz bipolar core fragments (Fig. 7a, c), a quartzite bladelet (Fig. 7d), a quartz borer (Fig. 7b) and two small quartz flakes (<20mm). These artefacts show that Later Stone Age foragers used the site, but in what capacity? The narrow platform makes Lubungu an unlikely base camp. A much more extensive excavation is needed to characterise the human use of the site.

SUMMARY

The distribution of geometric art across the miombo belt of south central Africa from Angola (Gutierrez 1996) to southern Tanzania (Collinson 1970) and the distinctive content of the art suggests a woodland culture area may have existed during the Holocene which incorporated common beliefs, symbols and material culture. Today, only the art and archaeology survive. These links are currently being investigated (Barham & Smith in prep.) but in the interim Lubungu Pontoon extends the known range of painted sites westward and draws attention to outstanding issues of chronology and interpretation. Direct dates do not exist for the art of south central Africa, and all current chronologies are by necessity relative; based on superimposition, stylistic comparisons and a few indirect associations with dated archaeological assemblages. The radiometric dating of the Lubungu panel would provide a minimum age for the art and be a small step toward building a local chronology, but one of potentially wider application.

The fact that there is no extant forager culture in the region makes it difficult to draw ethnographic analogies with areas where very different artistic traditions survive into the historic present. The art of southern and eastern Africa, with its emphasis on human and animal imagery, has little in common with the geometric art found north of the Zambesi. This lack of stylistic correspondence may signify an ideological break with the pan-Bushman system of beliefs, as expressed through communal rituals, and with images derived from altered states of consciousness (Lewis-Williams & Dowson 1989). Stylistic parallels do exist with the art of extant foragers in the forests of central Africa, but the relevance of this living tradition to the prehistoric art of south central Africa remains to be demonstrated. A close synthesis of ethnographic and archaeological data is now needed to ground the geometric tradition in time and to reconstruct its social contexts.

ACKNOWLEDGEMENTS

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RESEARCH NOTES

METALWORK FOUND IN LATE STONE AGE CONTEXTS IN THE WESTERN AND SOUTHERN CAPE

DUNCAN MILLER, TONY MANHIRE, ROYDEN YATES, ANTONIETA JERARDINO & JOHN PARKINGTON

Department of Archaeology, University of Cape Town, Rondebosch 7701, Cape Town

INTRODUCTION

Surprisingly few metal artefacts of either indigenous or European origin have been found in Late Stone Age contexts in the known areas of earliest contact in the Cape. This research note puts on record nineteen such artefacts for comparison with similar material found elsewhere in South Africa. It is remarkable that so little by way of metalwork has been recovered from Late Stone Age contexts in the western and southern Cape, an area in which vigorous trade in copper and iron between colonists and indigenous people is well documented.

In August 1993 David Crass and Garth Sampson published a paper in *Martevaan* No. 9 (the Newsletter of the Cape Historical Archaeology Association) illustrating a small, triangular piece of copper sheeting with two perforations from Abbot's Cave, and noting that "no documented analogue has been found" (Crass and Sampson 1993). In the following issue (*Martevaan* No 10) Tim Maggs wrote to suggest that the perforated copper sheet was an item of personal adornment similar to those known to have been worn by Khoisan and Sotho-Tswana people (Maggs 1994). This prompted us to look at the small collection of metal artefacts assembled over the years from Later Stone Age contexts by archaeologists at the University of Cape Town. This research note is intended to illustrate this material in order to make it accessible to other archaeologists for comparative purposes. It represents artefacts collected over the past twenty years by various people. The items are listed in Table 1 and what information accompanies them or we have managed to obtain is reproduced below.

Copper pendant - KP 15/1, Kleinplaas, Gifberg (31.28.48S; 18.28.12E)

This is a small triangular copper plate, 20 mm long and 18 mm wide and about 0,5 mm thick (Fig. 1). It is only lightly corroded with a light green copper oxide coating. It is slightly concavo-convex and has one slightly irregular but symmetrically positioned perforation. This artefact closely resembles the one illustrated from Abbott's Cave (Crass & Simpson 1993) except that the latter had two small perforations. This artefact was collected by Duncan Miller under NMC permit 9/2/097/5 dated 23 October 1991. It was found in the dripline of a very small rock shelter, which had several disused upper grindstones lying on the surface, as well as indications of recent intermittent use like fragments of Hessian sacking.

Brass cartridge case - KP 15/2, Kleinplaas, Gifberg, (31.28.48S; 18.28.12E)

This artefact consists of a reworked spent brass cartridge shell. The base is 18,5 mm in diameter and the total remaining height is 28 mm. There are two parallel and horizontal score or chop marks on the one side (shown in Fig. 1) and several shorter ones on the other side, but the casing was not severed by these. The bulk of the shell has been torn away, leaving a jagged edge which was folded over, trapping a layered material like sheets of paper inside. This has not been sampled or identified. This object was found in the dripline of the same shelter as the Kleinplaas pendant described above. They are not necessarily coeval.

Copper button - Pepper Tree Hill PTH/9, 16/11/81, (32.21.10S: 18.29.40E)

This is the remains of a heavily corroded copper button (Fig. 1) from Pepper Tree Hill (spot height 143 m asl) on the north east side of Verlorenvlei, opposite Diepkloof Cave. The site is on the farm Matjiesgoeddrif and is 4 km north east of the farmhouse. There are several small deflation bays at Pepper Tree Hill and the button was collected on 16/11/1981 by Tony Manhire from the surface of the deflation bay PTH 9. The site is of interest as apart from the normal range of LSA stone tools there were many pieces of pottery and several trade beads, indicating a late occupation date. The button was originally about 22 mm in diameter, with an inverted rim. The inner surface still retains impressions of fibres preserved in the copper corrosion product, indicating that it was buried while still attached to fabric.

Table 1. Metalwork from Late Stone Age contexts in the western and southern Cape

NUMBER	LABEL	LOCATION	OBJECT	MATERIAL	MASS (g)
1	KP 15/1	Kleinplaas, Gifberg	pendant	copper	1,25
2	KP 15/2	Kleinplaas, Gifberg	cartridge shell	brass	14,16
3	PTH/9	16/11/81 (or 83???)	button	copper	4,11
4	VV1	H6, Surface	loop	brass	0,55
5	EBC	C9, Surf and dolly	plate	brass	1,09
6	EBC (CAR 3)	C9, Level 1, B patch	plate	brass	0,44
7	EBC (CAR 3)	C8, Ash and twigs	rod	brass	7,74
8	WDSP/2	8/4/83	button	brass	0,41
9	DSM	C7, Spit 2 28/10/90	button	brass	1,52
10	TR 4	8/7/91	button	brass	0,55
11	LOR 16	7/7/91	arrowhead	iron	0,60
12	CAR 5	G3, Dung crust	pendant	brass	1,42
13	CAR 5	Andriesgrond talus stope	disc	brass	3,21
14	CAR 5	Base of 2nd bedding bottom	button	brass	1,89
15	CAR 5	I3, Hearth next to bedding 8	ring	copper	3,19
16	CAR 5	Surface 12m from ref pnt, 1m N	plate	brass	0,94
17	Langberg	rock shelter 33°53.7'S: 21°44.1'E	button	gilded brass	9,24
18	Tortoise Cave	Tim Robey	pendant	brass	2,37
19	Tortoise Cave	Tim Robey	bead	brass	0,39

Brass loop - Voëlvlei VV1, H6, Surface, (33.24.00S; 19.04.01E)

This is a small loop of brass, held closed by a perforated plate (Fig. 1), found at a site on the south-eastern end of Voëlvlei Dam (Smith, Sadr, Gribble & Yates 1991:81). It is only lightly corroded. The greatest dimension of the loop is 8 mm, and it is made of flat strip about 2 mm wide and 1 mm thick. It is probably the back of a European button. This artefact has been described earlier as a copper bead (Smith *et al.* 1991:84).

Brass plate - EBC, C9, Surf and Dolly, (32.19.03S; 18.19.05E)

This is a small, roughly rectangular brass plate, with irregular margins and a small tear at one corner (Fig. 1), from Elands Bay Cave. The maximum width is 20 mm, the height about 12 mm and the thickness about 0,5 mm. It is slightly concavo-convex and is heavily corroded. It was recovered from a surface layer dating from very close to present to around 300 years ago. No plausible items of historic European material culture were found in this level besides this metal artefact. The unit with which it was associated is highly shelly, with quantities of grass, twigs, and ash.

Brass plate - EBC, C9, Level 1, B patch, (32.19.03S; 18.19.05E)

This is a very corroded fragment of brass plate (Fig. 1) from Elands Bay Cave. The margins are very irregular with no trace of any regular geometric outline, and the current thickness is about 0,5 mm. It is slightly concavo-convex.

Brass rod - EBC, C8, Ash and twigs, (32.19.03S; 18.19.05E)

This is a slightly curved brass bar with rectangular cross section, from Elands Bay Cave. The exterior is rough, as though cast, with some adhering sand grains and is lightly corroded with a coating of pale green oxidation product. It is currently about 63 mm long, about 6 mm wide, and 3 mm thick. It has been sampled, presumably for metallurgical analysis, but neither the sample nor analytical results appear to be available.

Brass button-WDSP/2, 8/4/83, (32.12.32S; 18.22.58E)

This is the modified top of a Dutch brass button (Fig. 2), perforated for use as a pendant. It is a hollow dome about 13 mm long by 11 mm wide, and less than 0,5 mm thick. It has a single perforation, which has torn through the margin. The site WDSP 2 is a large shell midden banked up against a small rock shelter about 4 km inland from the sea, on the northern bank of Wadrifsoutpan, the shallow vlei at the mouth of the Langvleirivier. The artefact was collected by Tony Manhire on 8/4/83 from the surface, with stone artefacts, ostrich egg shell beads and pottery suggesting terminal Late Stone Age occupation. Brass pendants of this type have been recorded distributed between the Cape and the Marico (Miller & Markell 1993). They may have been traded from the Cape, through Namaqualand, to the interior.

Brass button - DSM, C7, Spit 2, 28/10/90, (33.06.03S; 18.00.02E)

This is a modified top of a Dutch brass button (Fig. 2), similar to the one described above. It was excavated from the site of Drie Susters Main, in the Posberg Reserve (Smith et al. 1991:77). It is a hollow dome about 16 mm in diameter, and less than 0,5 mm thick, with a single perforation punched through from the inner surface.

Brass button - TR4, 8/7/91, (32.03.25S; 19.06.30')

This is a modified Dutch brass button (Fig. 2), consisting of a hollow dome approximately 11,5 mm in diameter and less then 0,5 mm thick, with one

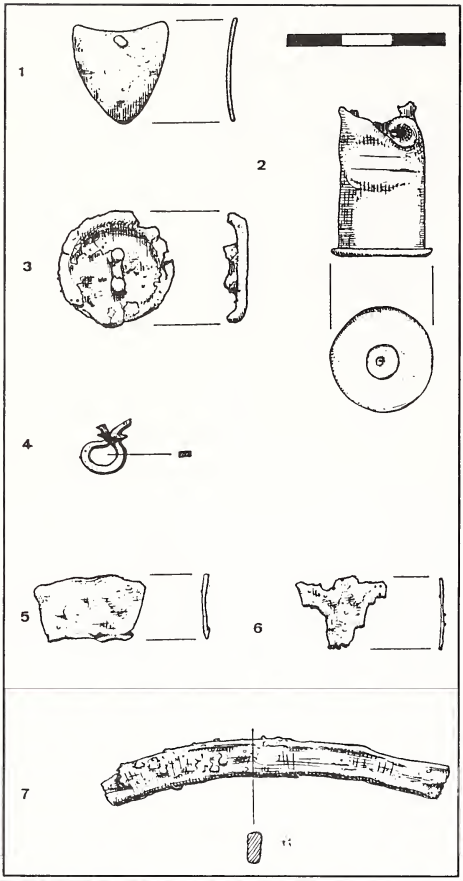

Fig. 1. 1, Copper pendant; 2, brass cartridge shell; 3, copper button; 4. brass loop; 5, brass plate; 7, brass rod (scale divisions each 10 mm).

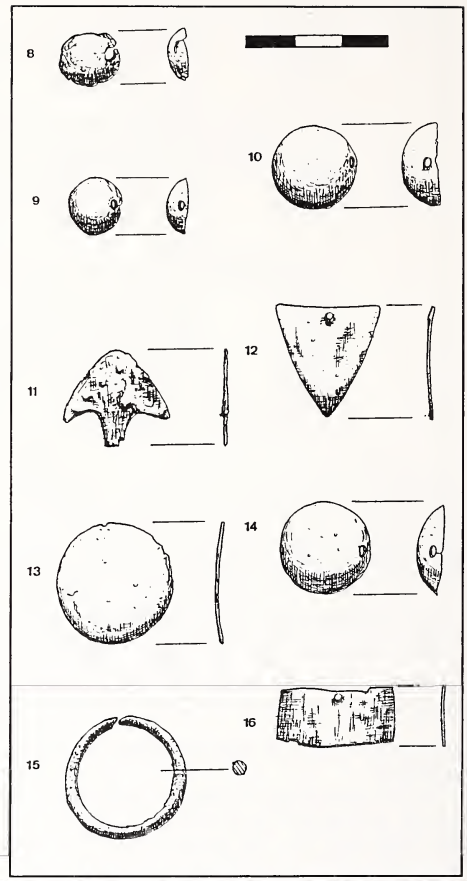

Fig. 2. 8, Brass button; 9, brass button; 10, brass button; 11, iron arrowhead; 12, brass pendant; 13, brass disc; 14, brass button; 15, copper ring; 16, brass plate (scale divisions each 10 mm).

perforation punched through from the inner surface. The site TR4 is located in the Pakhuis area of the Clanwilliam district, east of the Brandewyn River. It is a moderately sized rock shelter offering good protection from the elements. There are few rock painting, but a deep deposit and copious quantities of stone artefacts attest to a favoured place of residence. The site has not been excavated. The pendant was found on the surface in the drip-line.

Iron arrowhead - LOR 16, 7/7/91, (32.04.10S; 19.01.35E)

This corroded iron arrowhead is 22 mm wide, 19 mm long, and about 0,5 mm thick (Fig. 2). It was found on the farm Lorraine, on a small rocky ledge below the entrance of Eland Cave, from which it had clearly been washed. Eland Cave ranks as one of the major rock painted sites in the Pakhuis area. Set well back into the rocky heights it commands a fine view over the Brandewyn valley. The site has a shallow deposit and fair quantities of stone artefacts. Recently, a simultaneous burial of two children was excavated from the shelter deposits after they became exposed on the surface. As far as we know, this is the only example of an iron arrowhead found in a Late Stone Age archaeological site in the western Cape.

Brass pendant - CAR 5, G3, Dung crust, (32.11.40S; 18.52.05E)

This triangular brass pendant (Fig. 2) from Andriesgrond is very similar to the copper one from Kleinplaas

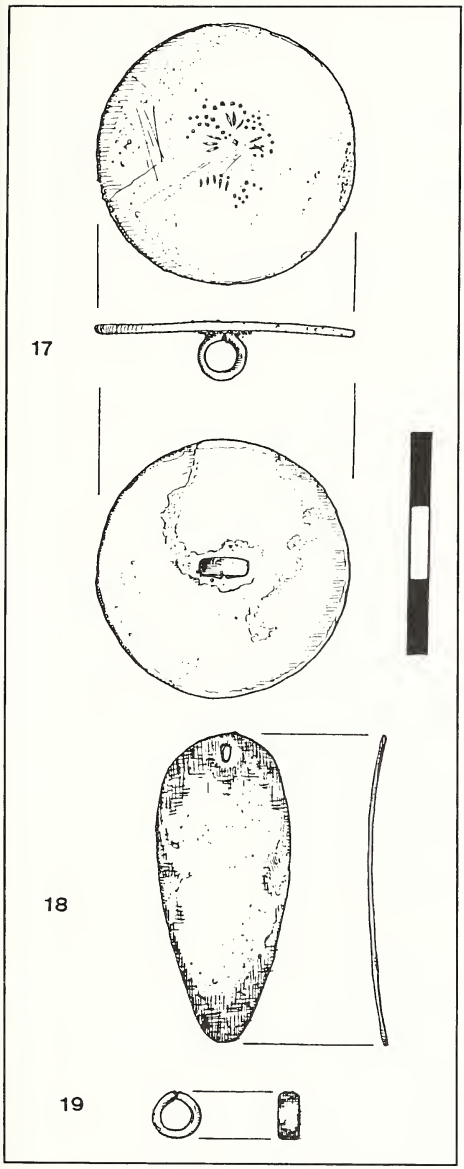

Fig. 3. 17, Brass button; 18, brass pendant; 19, brass bead (scale divisions each 10 mm).

in the Gifberg. It is an isosceles triangle 23 mm long and 22 mm wide and the metal is about 0,4 mm thick. It is only very mildly corroded with a black patina, and has a single symmetrically punched hole. It is slightly concavo-convex with the hole punched from the concave side.

Andriesgrond is a shelter with a long, but intermittent, history of use as a living site by people. A date of 180 BP has been obtained on burnt grass bedding flanking a central hearth. Besides the brass pendant, some fragments of European stoneware ceramics were recovered from the bedding, as well as a piece of a clay tobacco pipe bowl. The form of the pipe bowl indicates a seventeenth to eighteenth century age.

Brass disc - CAR 5, Andriesgrond talus slope

This is a slightly concave brass disc, 26 mm in diameter and about 0,8 mm thick (Fig. 2). It is lightly corroded with a green tarnish, and is unornamented and not perforated. It was found on the talus slope of Andriesgrond shelter, described above.

Brass button - CAR 5, Base of 2nd bedding bottom

This is a modified Dutch brass button, a low hollow dome about 19 mm in diameter and about 0,5 mm thick (Fig. 2) from Andriesgrond. It has a single perforation, punched through from the concave side, which has torn through the margin.

Copper ring - CAR 5, 13, Hearth next to bedding 8

This is a copper loop or ring, about 25 mm in diameter (Fig. 2) from Andriesgrond. It is made from round section wire of uneven thickness, but averaging about 3 mm in diameter, which has been flattened slightly on both sides in places.

Brass plate - CAR 5, Surface 12 m from reference point, 1 m N

This is a thin, rectangular, brass sheet (Fig. 2) from Andriesgrond. It is 24 mm long, between 10 mm and 13 mm wide, and about 0,25 mm thick. It is slightly concavo-convex, with the single symmetrically placed perforation punched from the concave side. It is rough in the "inside" but polished smooth on the "outside", lightly corroded with a dark brown patina. It may have been used as a pendant, or attached to a garment.

Brass button - Langberg, rock shelter (33.53.42S; 21.44.06E).

The site from which this artefact was collected is a rock shelter on the farm Langberg. This brass button consists of a slightly domed disc 35 mm in diameter and about 1 mm thick, with a loop soldered or brazed onto the back. The front is very worn but the remains of punched ornamentation are visible, some of the indentations still carrying a yellow pigment that looks like gilding (Fig. 3). The button was found by Sandy Gush of the Wilderness on the talus slope of a small rock shelter with rock paintings of fish-tailed figures. The button was associated with pottery and some stone tools.

Brass pendant-Tortoise Cave (32.19.37.S; 18.21.37E).

This brass pendant (Fig. 3) was found in March 1977 at Tortoise Cave near Elands Bay. It was found outside the shelter on the surface and was collected before

excavations started at this site. The pendant is a narrow oval, 42 mm long and 18 mm wide and made from sheet about 0,5 mm thick. It is slightly concavo-convex with an elongated hole symmetrically situated at the top.

Brass bead - Tortoise Cave (32.19.37S; 18.21.37E).

This brass bead (Fig. 3) was recovered during November 1981 from a unit belonging to Layer 1a ("Back of Degas"; square K3) in Tortoise Cave during excavations by Tim Robey. The bead was found a few centimetres away from seven glass beads. Layer 1A consists mostly of bedding material and is dated to 760 ± 50 BP (Pta-3600). It is possibly that this layer might well contain more recent material and the date should be considered as a maximum age. The bead is about 7 mm in diameter, and made of rectangular section wire or strip which is about 2 mm thick. The join is open, although filled with corrosion product.

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We wish to thank the various people who collected these artefacts for making them available, and Philip Barrett for the drawings.

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LETTERS AND COMMENTS

NDONDONDWANE AND THE ARCHAEOLOGY OF DEEPLY BURIED DEPOSITS CONDUCTED UNDER UNUSUAL CONDITIONS:

A RESPONSE TO VAN SCHALKWYK *ET AL.*

JANNIE LOUBSER

New South Associates, Inc., 6150 East Ponce de Leon Avenue, Stone Mountain, Georgia 30083, United States of America

After reading the most recent report on the 1995 excavations at Ndondondwane by Van Schalkwyk, Greenfield and Jongsma in Southern African Field Archaeology (Vol. 6, No. 2, 1997) and in Nyame Akuma (No. 47, 1997), I felt a response was necessary to clarify some ostensible inconsistencies with previously published excavations at the same site. I also believe certain misunderstandings and omissions in their paper cast doubt on my competency as an archaeologist. Some of the responsability for this situation is clearly mine, as I should have been more explicit in my description of field methodology and personnel, for example. But up until now, one aspect of this project was not widely known; the fact that my excavations occurred under the auspices of the South African Defense Force between 1982 and 1983, in less than ideal research conditions. This letter addresses two main issues; appropriate methodologies to deal with buried archaeological deposit and the role of different research contexts.

Ndondondwane is an incredibly rich site on the northern side of the Thukela River threatened by proposed dam building activities. For this reason it was excavated first by Maggs in 1978 (Maggs 1984) and later by myself in 1982 and 1983 (Loubser 1993). With the benefit of hindsight, funding and a clearly defined research goal, a joint team consisting of Van Schalkwyk, Greenfield and Jongsma excavated substantial areas at Ndondondwane in 1995. With three separate excavations done by different teams under different conditions, it can perhaps be expected that not all results will appear compatible. Add to this mixture the divergent research goals, interests, skills, and methodological approaches of various researchers, it is only to be expected that results would appear incongruent. But over and above the different excavation contexts, each new excavator at a site has more information at his/her disposal as well as the benefit of hindsight. In this letter I propose that it is the responsibility of the most recent excavator to properly synthesize the results of all previous excavations at that site, and attempt to do this in an even-handed fashion, focusing not only on perceived errors but also use the results of previous work in a positive and productive way.

Cultural Resource Management (CRM) archaeology in the Southeastern United States of America has been designed to build on the results of previous research. It has also been designed to glean the maximum amount of information from buried archaeological deposit, reminiscent of the alluvial/colluvial setting of Ndondondwane. Unlike highly visible Late Iron Age stone-walled settlements, for instance, many archaeological sites in the American Southeast are buried under plough zone deposit and therefore not always visible on the surface. One way to address this situation is a step-like procedure divided into three phases, each consecutive phase involving an additional level of effort. Phase I survey involves site identification and delineation of site boundaries by means of regularly spaced shovel test pits. Based on the results of a Phase I survey, the more promising sites are then subjected to Phase II test excavations. Typically, testing involves a grid of shovel test pits across the entire site to determine artefact concentrations, or hot spots. Test units (ranging from 2 x 2 metre to 5 x 5 metre blocks) are then placed in selected hot spots. If the site shows further promise at this stage of investigation, then entire areas are stripped with heavy machinery during Phase III data recovery excavations.

Due to the competitive bidding process prior to the commencement of a new phase, often each phase is done by a different archaeological company. In this environment, archaeologists constantly confront the problem on how to incorporate the results of earlier work, very often done by different people. This problem is compounded by the tendency that with each new phase, different information is retrieved. For example, Phase II test unit excavations almost invariably capture details missed

during initial Phase I shovel test pit surveys. Horizontal machine stripping of substantial plough zone deposit during final Phase III data recovery excavations in turn expose features and finds not anticipated during Phase II testing. But in spite of the increased data recovered by removal of additional deposit, it is also true that certain information is recovered at the initial survey level which is not found again, even during massive data recovery excavations. The *onus* is therefore on the final Phase III archaeologist(s) to account for all the information recovered at the site, including those recovered during the preceding and less extensive Phase I and II excavations. Partly due to limited time and money, other researchers often consult the Phase III report as the authoritative version, assuming that it accurately accounts for everything which has been done before. In practice, however, a Phase III report can give a misleading picture of previous work, and it often helps researchers to consult the Phase I and Phase II reports for alternative perceptions and presentations.

Similar to many buried sites in the American Southeast, the alluvial/colluvial settings at riverine sites such as Ndondondwane, make it especially difficult to detect what is underneath without extensive excavations. Non-intrusive techniques to detect buried features and artefact concentrations, such as Ground Penetrating Radar, have proved to be a very effective exploratory tools, but often with misleading results, such as falsely representing buried bioturbation as cultural features. Even intrusive techniques, such as shovel testing and test unit excavation, can also be misleading, since artefact voids have been shown to sometimes correspond with buried habitation surfaces which have been kept clean by the prehistoric occupants. In the final analysis, only the stripping of big areas can ground truth for the actual existence of features and artefact concentrations at deeply buried sites, such as Ndondondwane.

Unlike the standardized step-like excavation procedure current in Southeastern America, the Ndondondwane excavations followed a somewhat different trajectory. The level of effort of Maggs's preliminary excavation was like a Phase II test excavation in the United States. Maggs's team excavated the most dense artefact concentration visible on the surface of the ploughed field. No Phase I survey was conducted prior to or during Maggs's excavations, so artefact concentrations other than the one he worked on were not investigated at the time. When I was sent into the field by the South African Defense Force to continue Maggs's excavations, my primary mission was to completely excavate the rich subsurface mound partially excavated by Maggs. This proved to be very fruitful exercise, since in addition to the ceramic mask fragments and baked clay figurines found by Maggs, we found various remains of an iron furnace to the west of Maggs's excavations. Although Maggs found a few fragments of iron ore and calcite, his excavations were east of a slag-lined bowl and the baked clay walls and clay tuyeres of a smelting furnace. Thus, contrary to the claim made in the latest Ndondondwane paper (Van Schalkwyk *et al.* 1997:64), information on the furnace is not to be found in the Maggs paper but in the one written by Loubser.

It is important that researchers interested in Ndondondwane distinguish the properly excavated and analyzed furnace remains on the northern side of the mound area from the baked clay remains found in the tall grass on the southern side of the ploughed field. As my task was to concentrate on the mound area, I never properly examined this pile of baked clay on the site periphery, apart from mapping it during a theodolite survey on a hot summer afternoon. Since I had reservations about this pile and a similar pile in a neighbouring ploughed field farther to the south, I should have placed a question mark on the map behind at least the one which was shown by Van Schalkwyk's Phase III data recovery excavations to be the remains of a historic pump house. Fortunately, apart from appearing on my map, this erroneously identified "furnace" did not feature in my preliminary interpretation of the site layout. Contrary to a statement made by Van Schalkwyk and his co-authors, I never explicitly interpreted this as a smelting area associated with the main site.

Like Maggs's initial excavation, the level of effort of my excavations resembled Phase II test excavations in America, instead of the full-scale Phase III data recovery excavations and stripping executed by Van Schalkwyk and his Canadian colleagues. Moreover, my excavations were not preceded by a systematic Phase I level survey of subsurface deposit and artefact distribution. However, since I did my stint of National Service in the South African Army at the time and lived next-to the site, I had the opportunity to conduct walk-over surveys of the area during week-ends and noted every artefact exposed on the surface. Each surface artefact occurrence was plotted during the theodolite survey. Of course, additional artefacts appeared after heavy downpours or ploughing, but this did not alter the identification of the main concentrations.

It was actually soon after ploughing of the northern end of the field that we found ceramics on the surface on top of what became known as the dung area. Since I had to find a separate area for a field assistant to excavate, the dung area excavations were initiated. It is important to note that these excavations were conducted over and beyond the initial aims of the investigation. Contrary to claims that Loubser test excavated the dung area (Van Schalkwyk *et al.* 1997:67), I never excavated in this area due to the fact that the field assistant claimed it as his domain. Since his claim had the support of superior officers in the military, it had to be closely followed. The only time I actually worked in the dung area was immediately prior to my removal and confinement in Eshowe by the South African Defense Force. This was late one afternoon when the assistant was away. During this brief window of opportunity I did the plan and profile maps as presented in the 1993 report. Under such bizarre conditions, it was often difficult to conduct proper fieldwork on the site, even though I was the lieutenant supposed to be in charge of excavations.

While confined to the military base in Eshowe - for

reasons I still do not fully comprehend - the South African Defense Force afforded me the opportunity to analyze all the artefacts excavated up until my departure from Ndondondwane. Repeated requests to revisit the site in order to double-check certain field observations were denied by my superior officers. Subsequent to my removal from the field, the field assistant opened additional units within the dung area without keeping proper records. To make a long story short, my descriptions of the dung area were incomplete due to incomplete excavations and record keeping beyond my control. Thanks to subsequent systematic excavations by Van Schalkwyk and his Canadian colleagues, the dung area is now placed within a proper context. It is untrue, however, when Van Schalkwyk and his colleagues refer to any of the actual dung excavations as the work of Loubser. While Van Schalkwyk and his colleagues rightly allude to the unfavourable research context of my Ndondondwane excavations in Southern African Field Archaeology (Van Schalkwyk *et al.* 1997:64), this is omitted from their Nyame Akuma article. I feel this omission casts doubt on my competency as an archaeologist since it creates the misleading impression that it was me who incompletely excavated and described the dung area.

A more systematic survey of the site was not part of my initial goal and any information in terms of artefact concentrations outside the ploughed field and possible site layout was considered an added bonus. It is nevertheless important to note that I never stated "... that the site was enclosed within the modern ploughed field" (Van Schalkwyk *et al.* 1997:64). In fact, both on my map (Loubser 1993:111) and in my site description (Loubser 1993:112), I refer to a surface occurrence of daga and pottery in an area some 40 metres upslope and east of the ploughed field's edge. When my map is compared to that of Van Schalkwyk's team, this occurrence corresponds with their Scrape 2. Moreover, I also show daga occurring in the area north of the dung area, corresponding to their Scrape 4. Where I did make an interpretive error, based on surface artefact scatters, was suggesting that huts may form a line upslope from the dung area. This error was partly due to my failure to detect the deeply buried burnt hut-floor subsequently exposed by Van Schalkwyk's team in the area slightly east and downhill from the dung area and west of the mound area.

The determination and interpretation of the exact settlement layout was not the main concern of my paper in any case, but an interesting aside which obviously needed further investigation. Limited sampling with a small auger during some spare time immediately prior to my removal was exploratory and far from conclusive, as clearly demonstrated by additional excavations at Ndondondwane by Van Schalkwyk's team. Being aware of this limitation, I stated that "... excavation of the daga and pottery line north of the dung area is necessary to verify this reconstruction. The need for further test trenches and the paucity of comparative information from contemporary sites prohibit any definitive statement about the settlement pattern at Ndondondwane." (Loubser 1993:141). Subsequent publication of work done at other important Natal Early Iron Age sites by Whitelaw in 1994 (Whitelaw 1994) clearly shows circular arrangements of huts around central dung areas. Exactly how Ndondondwane compares to this pattern has not yet been spelt out by the Van Schalkwyk team, but it does not appear to differ significantly.

Ironically, my tentative interpretation that the settlement layout at Ndondondwane is cantered on a cattle byre does not appear to differ fundamentally from that of Van Schalkwyk and his colleagues. But apart from this issue, the main thrust and best demonstrated part of my paper - the significance of the mound as an initiation locality and subsequent smelting area - is only indirectly referred to by Van Schalkwyk and his colleagues in their preliminary data recovery report. I trust that in their final synthesis of all the work done at Ndondondwane, Van Schalkwyk, Greenfield, and Jongsma will meaningfully incorporate and do justice to previous work and perspectives at the site, as well as compare their results with other sites in the region, such as those excavated by Whitelaw.

The question if Ndondondwane would have been better understood if it was approached in a phase-like fashion is probably not relevant at this stage of investigation, since the most recent excavators did conduct an overall surface collection of plough zone artefacts, similar to a Phase I survey, as well as machine stripping, reminiscent of Phase III work. In spite of methodological incompatibilities, I personally believe the site has been better served with different archaeologists working on it. Coming from different backgrounds and with divergent research interests, each archaeologist viewed the data from a slightly different angle and so had something unique to contribute. Generally speaking, Maggs had an ecological perspective, while I adopted a more ethnographic stance. At this juncture it may be too early to judge their theoretical position, but Van Schalkwyk, Greenfield, and Jongsma at least seem to depend heavily on systematic research procedures. As a general guide for those researchers who have to reconcile three reports of one site I recommend the following; read Maggs for information on subsistence, read Loubser for information on the mound area, and read Van Schalkwyk for information on the rest, including settlement layout.

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ASPECTS OF RECENT RESEARCH AT NDONDONDWANE: A RESPONSE TO LOUBSER

HASKEL J. GREENFIELD

University of Manitoba, Department of Anthropology, Fletcher Argue 435, Winnipeg, MB R3T 5V5, Canada

email: greenf@cc.umanitoba.ca

This commentary is in response to the preceding comments by Loubser in this issue of Southern African Field Archaeology. In his comments on the preliminary reports of our 1995 field season at Ndondondwane (Greenfield *et al.* 1997; van Schalkwyk *et al.* 1997), Loubser makes a valuable contribution to the published knowledge about the site by reviewing some of the more poorly known aspects of history of research at Ndondondwane. This information is a welcome addition to what we have been able to glean out of the poorly archived data base from the previous excavations. It is important to note that Loubser's comment contains very few criticisms of our research. Instead, its focus is to try to put the research at Ndondondwane in a historical perspective. As a result, this commentary is an attempt to respond to only his criticisms (overt and implied) of our research. Other issues will be dealt with in future reports on the site.

First, Loubser criticizes us for not integrating the results of the previous researchers at Ndondondwane with our own studies. In general, this is a specious criticism since the primary intent of the two published reports was to present the preliminary results of only our first season (1995) of field work. Two more subsequent field seasons have taken place and our knowledge of the site has been greatly enhanced (Greenfield & van Schalkwyk *n.d.*; Greenfield 1997, 1998), in addition to a full lab season. During our research at the site, we attempted to collect as much information on previous research and on the background to that research as possible. For purposes of brevity, much of that information was only briefly alluded to in our two preliminary reports on the site (van Schalkwyk *et al.* 1997; Greenfield *et al.* 1997). Nevertheless, a substantial part of these preliminary reports reviewed the history of research at the site. Space considerations imposed by the publishers limited discussion of the implications. It has always been planned that there will be a fuller consideration of the historical context of the research at Ndondondwane n the final report.

The task of integrating the results of the previous researchers at Ndondondwane with that of our studies has been both rewarding and frustrating experience. The experience has been both rewarding when material was located, and frustrating when it remained beyond our reach. We have tried to locate original field notes and summaries of all previous research at the site, while at the same time tapping into the historical memory of participants. While Maggs' field notes from the original excavations (Maggs 1984a) are archived in the Natal Museum, Loubser's original field notes disappeared from the National Museum in Bloemfontein sometime after his departure to the United States. The field notes have not been located despite the attempts by Loubser, myself and the National Museum staff to relocate them. Copies of some of Loubser's field maps were located in both the Natal Museum and the McGregor Museum, but these are merely graphic summaries of a more detailed data base, most of which were already published by Loubser (1993). After the conclusion of the final field season (1997), we spent three months in 1998-99 tracking down and re-analysing the artifactual remains from the earlier excavations (1976 & 1982-3). All of the well-provenanced remains have been re-analyzed using our coding systems and the data will be incorporated into the final reports. Later reports on the site will begin integrating the results gleaned from the reanalysis of the earlier data.

Second, Loubser implicitly criticizes our reports for not developing the historical context of our research with southern African Early Iron Age Archaeology. Research at Ndondondwane has paralleled the development of Early Iron Age research in South Africa. Maggs' (1984a) initial research at the site (conducted in 1976) was clearly

part of his effort to construct a culture historical framework for the region. This was typical of the research effort across much southern Africa during the 1970's. By the early 1980's, archaeologists were beginning to shift focus to a greater understanding of the social and economic organisation of EIA societies (*e.g.* Hall 1987; Maggs 1984b, 1984c). Loubser's (1993) research clearly falls within this genre. During the 1990's, a number of archaeologists have begun looking at the spatial dynamics of EIA communities (*e.g.* Huffman 1993; Whitelaw 1993, 1994; van Schalkwyk 1994a, b). Our phase of research at Ndondondwane was to test conflicting models of spatial model of Early Iron Age intra-settlement spatial organisation proposed by Huffman (1993), Loubser (1993), and Maggs (1984b, 1984c). As Stephen Jay Gould has commented in his numerous treatises on the history of evolution, it is important to evaluate the contributions of researchers within the historical context in which the research is conducted. For example, it would be unfair to criticize Maggs' (1984a) original work at the site in the same light as Loubser's or our research. Since Maggs began his research, there has been a pronounced shift away from culture history towards a greater understanding of the spatial dynamics of intra-settlement community organisation. We conducted our research with the benefit of the contributions of earlier scholars and in the context of changing goals for archaeological research.

Third, Loubser uses the step-wise structure of Cultural Resource Management (CRM) in the United States of America to criticize the history of research at Ndondondwane. The history of research at the site cannot be pigeon-holed into a such a structure. To imply that it should have followed the structure of CRM work is to ignore the historical development of archaeology in this region. The history of research at Ndondondwane, in fact, occurred in a step-wise fashion. Maggs' (1984a) research identified the site as an important location for increasing our understanding of the EIA of the region and helped plug holes in the local culture historical sequence. Loubser's research was organized to fill in obvious gaps in Maggs' results and to answer a different set of questions (function of the central midden known as the Mound Area). Our research built upon both Maggs and Loubser's research by shifting the focus away from the central midden to the entire site. As a result, it unfair of Loubser to criticize the history of research at the site as not conforming to the research structure of CRM in the USA. It evolved in a very different culture and historical context, and each step was designed to fill in the gaps in knowledge that were identified by earlier researchers.

Fourth, Loubser criticizes a few specific details of our reports. One of these represents what is clearly recognizable as sloppy bibliographical research on our part (specifically, mis-attributing the excavation of smelting furnaces and associated debris to Maggs' and not Loubser's excavation - this was clearly our error). A second criticism of our report revolves around the question of the historic pump house *cum* furnace at the south end of the site. Our work at Ndondondwane was designed to try to answer many of the questions raised by Loubser or raised indirectly in his report. One of the major issues unresolved by Loubser's research was the dimensions of the site. Since our research was designed to test conflicting spatial models of Early Iron Age intra-settlement spatial organisation (*e.g.* Huffman 1993; Loubser 1993; Maggs 1984b, 1984c), it was necessary to determine the dimensions of the site and each activity area. The nature of Loubser's published summary of his survey data (Loubser 1993) was too ambiguous to be able to establish boundaries, a necessary prelude to the investigation of intra-settlement spatial organisation. Therefore, one of our first tasks was to examine the quantitative distribution of remains across the surface of the site. A combination of systematic surface collection, auguring, test excavations, and conductivity survey have been employed to do so. The difference in approaches has been that we have had the luxury of planning a quantitative assessment of the surface material, something that was not part of the original research. The site seems about the same size as Loubser thought, but it is smaller to the south and longer to the north. At the very edge of the ploughed field (south end of the site - Loubser 1993, fig. 1), Loubser identified the presence of a concentration of furnace rubble and pottery. Even though he did not explicitly say that this was a smelting area, the clearly labelled description of the material from his map implied that this was an area of smelting activity. A description of this area was absent from his text. This is a good example of how misleading summary data can be for subsequent researchers. As a potentially significant activity area that might have significance for testing the various spatial models of EIA settlement organisation, we were obligated to investigate this area. It caused us to waste valuable and limited time and resources in order investigate this area. Each labelled area on a map should be fully described during publication and not left to subsequent scholars to sort out. A similar problem exists with the data from the Dung Area. Loubser's publication implied that he was responsible for the excavation. Therefore, we attributed the results to him. It is both interesting and valuable to learn that he was not responsible for the excavation and was simply trying to report data that would otherwise be lost. We applaud his efforts for presenting these data, but warn other researchers against falling into a similar predicament - attempting to present incomplete data without giving enough background information.

An important part of the history of research at Ndondondwane has been the excavation of the Dung Area. A previous unskilled excavator of limited analytical skills functioned independently of the field director (Jannie Loubser) due to the nature of military control over the excavations. This is not the fault of the Field Director since the excavations were conducted under the auspices of the South Africa Defense Force. As we will demonstrate in our final report (Greenfield & Van Schalkwyk, in prep.), the 1982-3 data from the Dung Area were inadequately excavated, poorly provenanced, and for the most part not curated. Ceramic samples from

the area were curated in paper bags that lacked provenance information, other than that they came from the Dung Area. These have been for the most part discarded. The bones, collected for the most part by Liz Voigt, are better provenanced. These are curated for now in the McGregor Museum. However, there is no linkage between the excavation levels from this area and the natural stratigraphy. As a result, these data were not re-analyzed for the final analysis. We have spent three seasons trying to sort out the stratigraphy and spatial patterning of activity areas in the Dung Area. The data from Loubser's report was important because it summarized his understanding of the area. However, as we have since discovered, it did not conform to the reality of the stratigraphy (which proved to be complex) nor the material remains. Rather than going into this issue in great detail here, we prefer to present our results of the Dung Area excavations separately in our next preliminary report. Nonetheless, we applaud Loubser's attempt to present these data.

In conclusion, it might appear that we were guilty of ignoring or misrepresenting the research of an earlier generation at Ndondondwane. The reality was quite different. Not only were the published and unpublished sources of information consulted, but also one of the previous excavators (Maggs) visited the site during our period of field work. In fact, over 20 South African plus other foreign professionals visited the site during our tenure there. Each was consulted as to their knowledge of the history and significance of the research. Loubser, unfortunately, never had the opportunity to visit the site during our excavations and survey because he had already left the country, and it was only recently that we were able to establish direct contact with him. Since then, we have had a fruitful correspondence which has substantially benefitted our analysis of the material from the site. As with his commentary, we look forward to his continued input in the future.

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Southern African Field Archaeology: ambj@warthog.ru.ac.za
Johan Binneman: amjb@giraffe.ru.ac.za
Lita Webley: amlw@warthog.ru.ac.za
Alex Schoeman: amms@warthog.ru.ac.za

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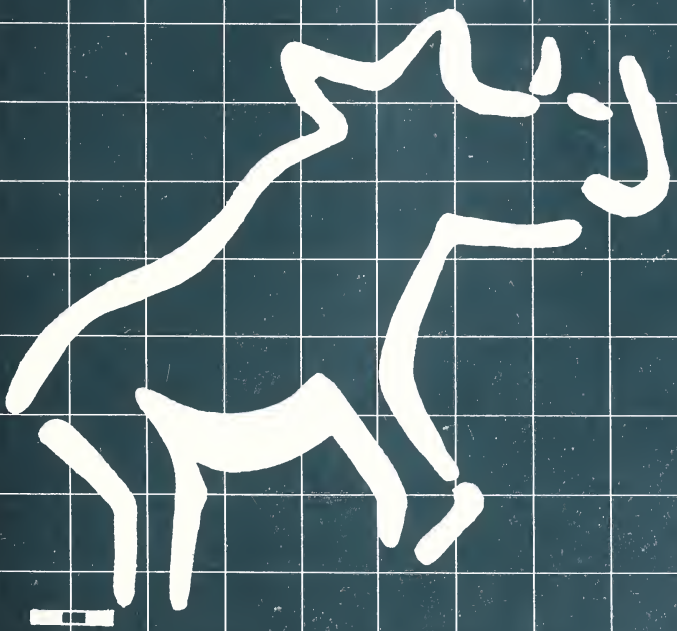

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Cover illustration:
Engraving of a rhinoceros in the Limpopo-Shashi Confluence area, p. 17.

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OPINIONS

THE DEAD AS SYMBOLS, OR DEAD SYMBOLS?

The dead are not at issue here. It is the disposition of the living towards the dead that concerns us (Morris 1996:79).

It is ironic that at a time when archaeology is starting to break into the public sphere through various outreach and educational programmes, the discipline is also beginning to face serious problems which may effect the future of archaeology in a substantial way. I specifically refer to the problem of sensitive remains.

For years now we have been aware of the constraints archaeologists are working under in countries such as the United States of America, Canada and Australia with regard to ceremonial and traditional sites. Most of the problems revolve around sensitive remains (human and ceremonial objects) and sites (sacred and ceremonial sites). For many years Native Americans have demanded that human remains and other sacred objects in public and private collections be returned to them. The opposition of the these communities to the excavation of prehistoric burial sites has had a great impact on archaeology and led to the passage of the Native American Grave Protection Repratriation Act of 1990.

This act established two requirements. In short it means that all federal agencies and museums which receive federal funds must compile an inventory of all their holdings of Native American human remains and associated funerary objects. A list of funerary objects not found in the graves, called "objects of cultural patrimony", must also be compiled. Where possible cultural affiliation of collections and objects must be established and in the case of human remains, lineal descendants with living Native Americans. The groups in question must then be notified and the material offered to them for repatriation. A group who disagrees with the institutional identifications can still request material for repatriation

The second requirement protects all Native American graves and other cultural objects found on federal and

tribal land. It requires archaeologists working on federal and tribal land to first consult with local groups concerning the treatment of all remains. It was hoped that this will discourage illegal trafficking in archaeological material. However, it is clear from many recent articles in the media that this is not the case.

In South Africa most archaeology departments house large collections of human remains. What should happen to these remains and are we ready and prepared to deal with these important issues? These remains contain different value contexts which should be negotiated between academics and the public. On the one hand there is no doubt that these bones are important study materials, but on the other, also contain social and cultural values.

Sensitive remains, human remains inparticular, have been discussed at previous SA3 conferences, but little has come from these rather casual discussions. A workshop on sensitive collections under the auspices of the South African Museums Association took place at the South African Museum during 1996. The workshop, attended by 25 participants was convened by Dr Graham Avery and facilliated by Dr A. Galla of the University of Canberra. Although a wide range of issues were addressed during the workshop, "discussions revolved around ethics rather than policy", and which included the following issue:

> develop a professional framework for South African circumstances within which the heritage sector can negotiate more widely on issues of sensitive collections and foster an atmosphere for open, constructive and responsible inter-cultural co-operation with **valid stakeholders** that will lead to negotiated partnerships rather than conflict (my emphasis).

Space does not allow for an in depth discussions on efficient policies and frameworks to deal with sensitive remains. However, a few remarks should be made concerning the "valid stakeholders".

With reference to Stone Age remains, one may ask who are the "valid stakeholders"? Are people who claim that they are "Khoisan chiefs" of some long gone ethnic group, be regarded as "valid stakeholders"? And can these people lay claims to sensitive remains?

Prof Alan Morris remarks, "No living South African can attest a cultural affinity with these people as their beliefs and way of life are long gone, but a few have a shared genetic origin. But does sharing a portion of genetic make-up mean that living people can claim the full heritage of the past?" (1996:79).

It is interesting to note that the 'Khoisan chiefs' who suddenly emerged as valid stake holders after the recent discoverey of the Kouga mummified San remains, do not recognize archaeological facts, data and information collected over the past 30 years through scientific research (including radiocarbon dating), concerning the Khoi and San. Nor would they have been interested if the Kouga find represented only 'bare bones'(pers. comm.). How do we negotiate any realistic "partnerships" with such attitudes?

Whatever happens in the future regarding sensitive remains (i.e., Khoi and San), archaeologists must negotiate from a position of strength, because:

1. All information about the early histories of these indigenous peoples of southen Africa have been provided by archaeologists who at all times have followed a high ethical and moral approach in studying past life ways in southern Africa. Unfortunately, many of the decendents of the peoples we study, display very little or no interest in archaeology. They are not interested in sensitive remains *per se* but rather the socio-political and financial implications and benefits they may have.

2. There is no clause in the Heritage Act of 1999 which prohibits any archaeologist with a valid permit from exhuming human remains, or which requires re-burial. At best, local communities/stakeholders may be invited to make inputs regarding the finds, but they have no veto rights.

3. Our situation is different from those of other countries and we should resolve our problems among all 'local stakeholders', rather than involve outside role players unfamiliar with local sentiments.

4. Unlike North America and Australia, few people are living on 'tribal land' in South Africa or have any evidence of the existence of such 'tribal land' in the past (LSA). In other words, few, if any claims can be made on grounds of direct lineage.

5. The NAGPRA of 1990 deals only with sites on federal and tribal land. However, most of the archaeological sites (LSA) in South Africa are situated on private land and permission to work on these sites rests with the owner, although the material belongs to and is protected by the Sate.

Whatever the arguments are, we are facing the problem of sensitive remains which must be resolved to the satisfaction of all concerned. I hope that the outcome of the negotiations do not harm an already fragile discipline or force archaeologists underground.

Johan Binneman
Department of Archaeology
Albany Museum
Grahamstown

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ON THE SIZE AND SHAPE OF LATER STONE AGE FIBRE-TEMPERED VESSELS FROM THE UPPER SEACOW RIVER VALLEY*

C. GARTH SAMPSON

Human Sciences Division, South African Museum
P.O. Box 61, Cape Town 8000,

and

Department of Anthropology. Southern Methodist University,
Dallas TX 75275-0336, U.S.A.

and

KARIM SADR

Archaeology Unit, Department of History,
University of Botswana, Gaborone, Botswana

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ABSTRACT

Ceramics from Later Stone Age lithic surface scatters in the upper Seacow River valley are dominated by fibre-tempered sherds, often associated with lesser quantities of Khoi ware. Historically equated with Bushmen hunter-gatherers, fibre-tempered bowls are found to be of a single, highly variable class which grades into scarcer forms including small bowls, very large bowls, saucer/dishes, and possibly into pots with convergent mouth and everted lip. No decorative motif is restricted to any part of this cloud of size/shape variability, but smaller vessels have fewer decorated rims. Smaller vessels also carry more comb-stamp than the larger ones, which have more rocker-stamp or various punctate row motifs. Overall, vessel size may have increased with time in the early part of the sequence, a trend also seen in the Khoi ware. However, the ranges of size/shape attributes in fibre-tempered ware differ so markedly from those of the Khoi ware that the two traditions appear not to merge, in spite of recurrent association on the same sites for at least 14 centuries. Furthermore, no difference could be detected between the ranges of attributes of fibre-tempered vessels from herder sites and non-herder sites. However, some of the rarer forms occur in tight groups of neighboring sites, hinting that they were the handiwork of individual potters. This echoes preliminary clay-sourcing results for the Khoi ware, and raises the possibility that some vessels were not moved far from their place of manufacture, in spite of their use by highly mobile herder-foragers.

> "They set the little pot to dry (in the sun) by the side of the large pot ...They also make another little pot, a little pot which is larger (lit. 'grown')"
>
> //kábbo on 'the making of clay pots' in Bleek & Lloyd (1911:345)

INTRODUCTION

Historical Bushmen of the South African interior were reported by several early travellers to be using fibre-tempered cooking bowls, and fragments of these vessels are known from Later Stone Age sites throughout the central and south eastern parts of the country. Early accounts and drawings of Bushman pots (Bollong *et al.* 1997) are quite similar: they describe rimless bowls with flat bottoms and near-vertical sides sometimes decorated with impressions. Rare texts give some idea of the size of Bushman bowls. They were "... small cooking pots, the capacity of which was from one pint to two quarts" (Dunn 1931:84). Although a pint (0,56 litre) sized bowl is indeed quite 'small' a two-quart (2,3 litre) one is clearly not, so this confirms the observation of //kábbo, quoted above,

that the women of his band made both large and small grass-tempered vessels. Whether these were recognized as distinctive 'types' by their makers remains uncertain, but //kábbo's 'little pot which is grown' may signal that they did not think in discrete size categories but rather as a continuum. No hint is dropped in either text about differences in the shapes of either small, 'grown,' or large bowls, nor can we discern which, if any of these size categories was the most popular, nor if other (non-bowl) vessel forms were present. The latter possibility is raised by the painting of Daniell (1804-6, 1820) which depicts a very large shouldered pot in a Bushman camp north of the Orange River, the same area in which Burchell was loaned an enormous pot by Bushmen (see below).

Some answers to these questions may be available in the very large, systematic collection of fibre-tempered sherds from surface lithic scatters in the upper Seacow River valley in the eastern Karoo (Fig. 1), which is only a few hundred kilometers south-east of //kábbo's home territory. The sherds, and a smaller sample from local rock shelters, were left by the historical Seacow River Bushmen and their herder-forager forbears. They have been the focus of intensive study, with investigations still in progress on their stamp-impressed decorations (Sampson 1988, Ridings & Sampson 1990), their chronology (Sampson & Vogel 1995, Sampson *et al.* 1997), their contextual seriation (Bollong & Sampson 1996), the chemical composition of their clay fabric (Pineda *et al.* 1990, Bollong *et al.* 1993, Bollong 1996, Bollong *et al.* 1997), the petrography of their grit tempering (Bollong 1996), variations in the fibre temper (Sampson & Vogel 1996) and the isotopic composition of fatty and other organic inclusions (Sampson & Vogel 1997). The aim of all this work has been to generate models of the complex spatial interactions between intrusive herders and the local hunter-gatherers with whom they seem to have integrated, and who evidently learned to make their own pottery during more than a millennium of contact (Sampson 1996, Bollong & Sampson in press). Although none of these programs has thus far addressed the question of fibre-tempered vessel shape and size-range, three more size/shape-related questions are begged by their combined results:

Were specific stamp-impressed decorations peculiar to certain vessel shapes and sizes? How do fibre-tempered vessel shapes and sizes differ from those of the Khoi ware with which they are so persistently associated? Further, did the fibre-tempered vessels made by hunter-gatherers differ in appearance from those made by their herder neighbors? These, plus the questions prompted by the historical accounts reviewed above, have encouraged us to measure and classify the rim sherds in the upper Seacow valley collection.

METHODS

The collecting, recording and curation procedures are described elsewhere (Sampson 1988). Prior to this analysis decorated and plain fibre-tempered sherds had been separated and stored, but rim sherds were never recorded

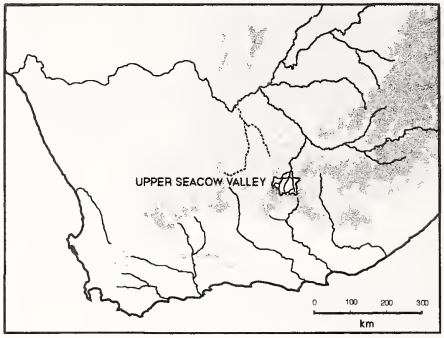

Fig. 1. Location of the study area in the South African interior.

in either category. In this study all identifiable rim sherds, whether decorated or not, were removed from the fibre-tempered component of each site. These were retained for analysis while the body sherds were recombined and returned to storage.

The following attributes were noted for each rim sherd. The lip was placed on a clear plastic template and moved across a set of printed concentric circles spaced at 10 mm intervals. The diameter of the circle which best matched the lip's curvature was recorded as the closest approximation of vessel mouth diameter.

On the same template circle, the sherd was then fitted between radiating lines printed at 3,6 degree intervals around the arc. Thus the percentage of surviving rim could be estimated. Next, the orientation of the lip to the plane of the template was subjectively judged as either wide-open, open, vertical or convergent (Fig. 2). Finally, the shape of the lip profile was attributed to one of the eight lip types in the system developed by Sadr (Sadr & Smith 1991) for the analysis of Khoi rim sherds in the south-western Cape (Fig. 3).

Each sherd was recorded as either decorated or plain, and impressed motifs were recorded according to the classes generated by Sampson (1988) for analysis of the whole collection. Lip type and rim profile categories were logged using a coding system of numbers and letters for brevity. All these data were entered into a computerized database for further manipulation to determine vessel size/shape categories. The vessel classes present at each site were then inventoried in a second database, from which the distributions of classes within the upper valley could be systematically mapped by computer, using layered software.

RESULTS

Fibre-tempered rim fragments were present on 499 surface sites (Fig. 4). Another 441 sites contained only plain body sherds, usually few in number, which are not considered here. The rim sample represents an estimated 1 458 vessels, of which 617 are decorated.

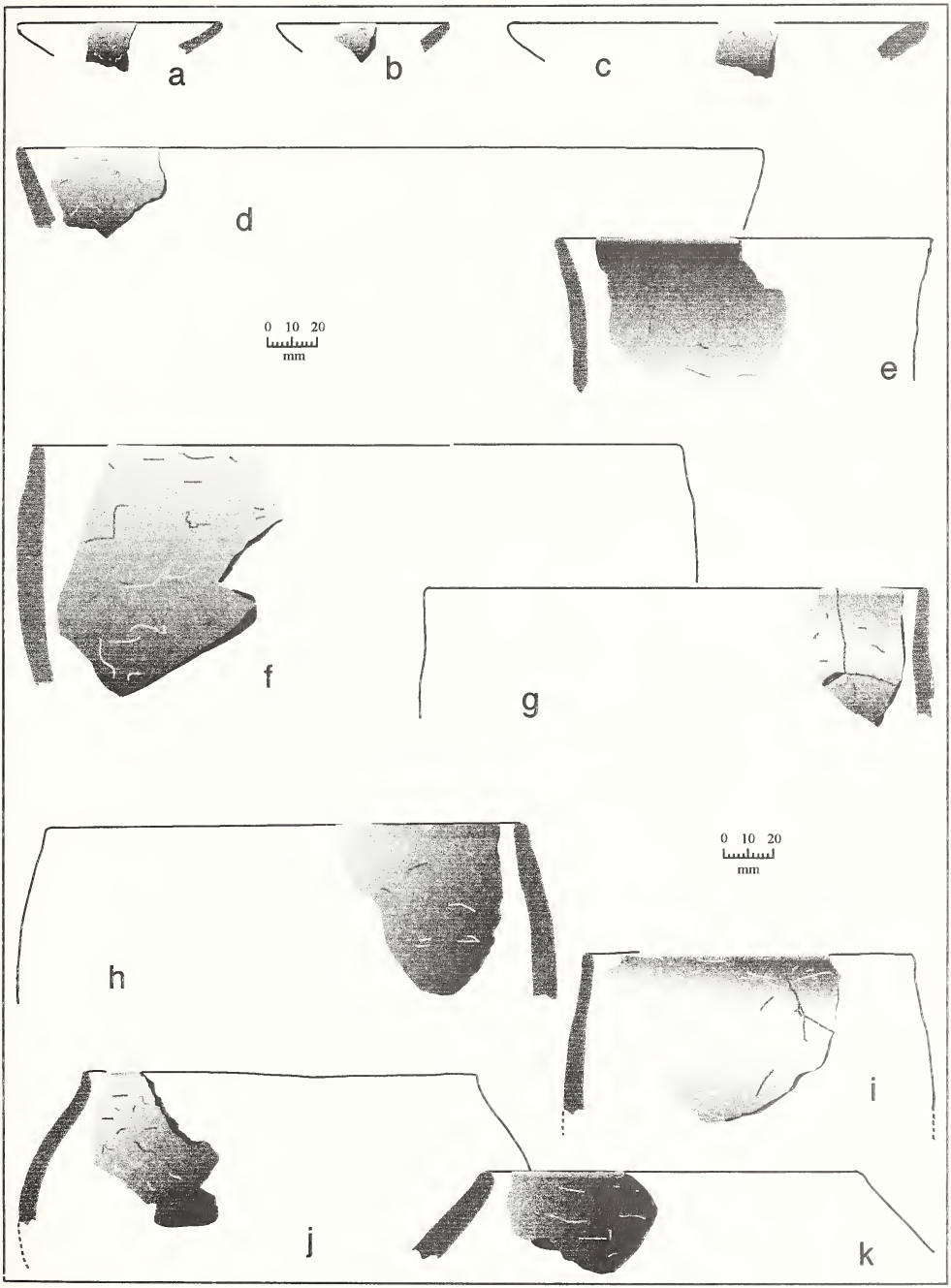

Fig. 2. Examples of different fibre-tempered bowl rim orientations: (a-c) wide-open; (d,e) open; (f,g) vertical; (h-k) convergent.

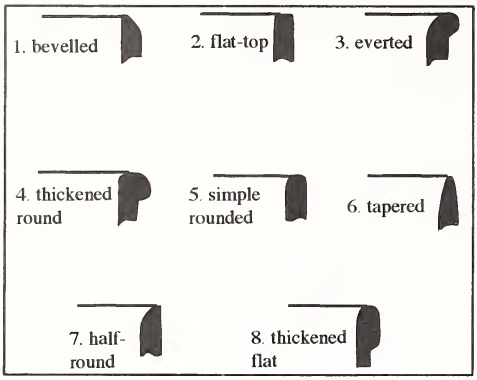

Fig. 3.Lip Types present on rims of fibre-tempered bowls. Types 1, 4 and 8 are extremely rare.

1777, which he was told had been abandoned the previous year. Although they were 'poorly baked' he could still see the decorative motif on them (Raper & Boucher 1988 I:85). Nevertheless, many older rims break down to such small pieces that they cannot be used for estimating mouth diameter. Altogether 446 specimens (30.6%) were excluded from measurement for this reason. Of those for which the percentage of surviving arc could be measured, most fall between 2-5% of the original circumference. Inevitably, nearly all those vessels represented by 6% or more of the rim are the smaller ones. This means that some larger vessels must have been excluded from measurement because they are too highly fragmented.

Another consequence of fragmentation is that many sherds are too small to estimate the rim's orientation to the vessel's horizontal plane. Altogether 672 specimens fell within this category, but in this case there is no particular bias towards any vessel size within the range. Of those excluded on this basis, 281 had enough arc to yield mouth

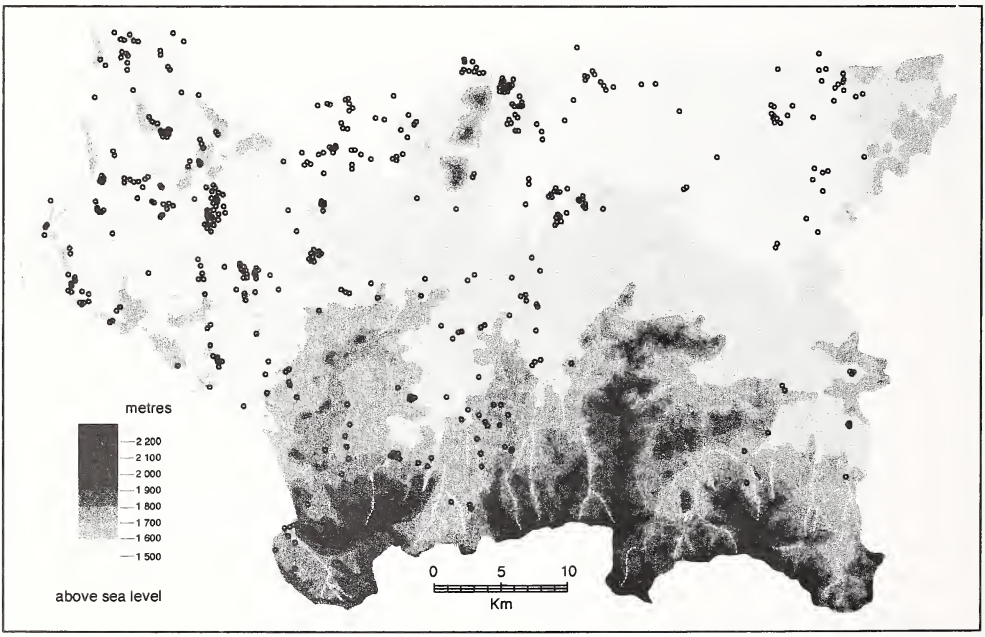

Fig. 4. Map of the upper Seacow River valley showing relief, drainage channels and sites with fibre-tempered rim sherds.

Fragmentation Bias

Although the fabric of fibre-tempered ware is quite friable, not all sherds on surface sites break down into very small pieces (Bollong 1996: 328 ff.), particularly those from sites dating to after European contact, which are only a couple of centuries old at most. For example, Gordon picked up (rocker-stamped?) sherds here in A.D.

diameter estimates. The distribution of their size frequencies closely resembles that for the fully measurable sherds.

Mouth diameter

The fragmentation obliges us to use orifice diameter as a crude reflection of overall vessel size. Volume estimates

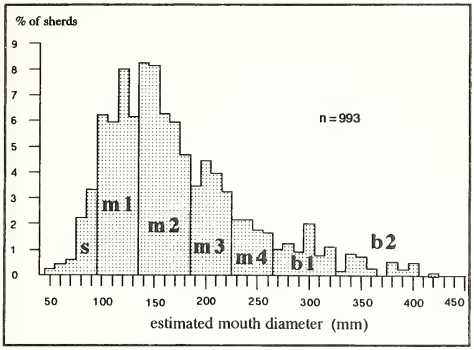

Fig. 5. Percentage frequencies of fibre-tempered rim sherds at ~10 mm intervals of mouth diameter. The arbitrary subdivisions (s to b2) are for descriptive convenience and do not denote size classes.

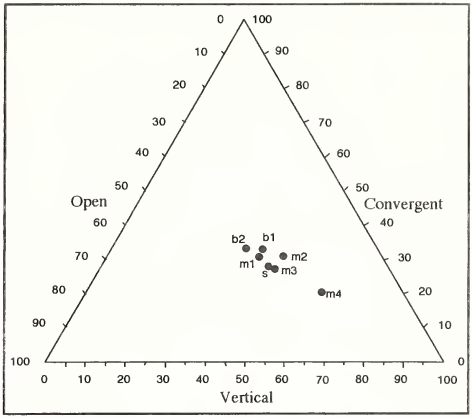

Fig. 6. Tri-axial graph showing frequencies of three rim orientations among the size segments defined in Figure 5.

are not possible without knowing the vessel's height and broadest width.

We also note that four of the early travellers' accounts imply in some way that Bushman bowls were rough and unevenly shaped (Bollong *et al.* 1997:282). Although no one stated categorically that the mouth was not well rounded, several Seacow valley vessels clearly show that bowl mouths could be quite asymmetric. There are 40 vessels represented by more than one measurable sherd and the arcs of 14 of these (35%) are variable. Although the differences are relatively small (10-20 mm) in most cases, there are a few which must represent nearly oblong mouths. All of these specimens were excluded from the comparative exercises to follow.

Because most vessels in the collection are represented by only a single rim, we are forced to assume that all their parent vessels had circular mouths. Although one third of them certainly did not, the differences were probably trivial. For 10-12 % of them, however, the error may be more serious but we cannot tell which sherds are involved. One consequence of this lacuna is that we have occasionally recorded two sherds from a site as separate vessels with the same lip type and rim orientation, but very different mouth diameters, when they were in fact from the same asymmetric bowl.

With these caveats in mind, the percentage distribution of measurable rims is shown in Figure 5. The smallest recorded mouth diameter is a surprising ~50 mm, no bigger than a modern demitasse. Nothing this small is mentioned by early travellers. The largest Seacow vessel is over ~400 mm, the size of a large basin, and certainly a match in size (although not in shape) for the pot loaned to Burchell by Orange River Bushmen "capable of holding about a gallon and a half" (Burchell 1824 II:32). Both these extremes, however, are rarities, and the bulk of the sample (61%) falls within the narrow range of 100-180 mm.

Thus bowl mouth diameters are distributed in a positively skewed curve, with the mode around 140-150 mm. Although there has been attrition of larger vessels from this measurable sample (see above), we doubt if it was severe enough to have caused all the observed skewing. There is no trace of bimodality, hence no support for the the notion that Seacow potters were consciously producing 'large' and 'small' vessels as discrete categories.

For analytical and descriptive clarity, we have subdivided this mouth-width continuum into seven arbitrary segments, namely small (s), four medium (m1-4), and two large (b1-2) segments separated at the values shown in Figure 5. Although we have chosen breaks in continuum suggested by small fluctuations in the distribution curve, these are not intended as rigid size 'classes' but merely as descriptive devices for the analyses that follow.

Rim orientation

There are four basic shapes to the upper profile of fibre-tempered vessels, either wide- open, open, vertical, or convergent (Fig. 2). Early eyewitness descriptions and drawings suggest only vertical sides, although the repeated mention of Bushman 'pots' hints that some may have been describing vessels with convergent rims, or necked jars.

The problem of bowl asymmetry discussed above is less marked in the vertical axis. Only three of the multi-sherd vessels were classed as both open and vertical, and a sherd from a fourth vessel changed from vertical to open along the arc of its rim. A fifth sherd changed from vertical to convergent along the rim arc. These were excluded from the comparative manipulations that follow.

Of the measurable part of the Seacow collection (n=786), only 15 specimens (1.9%) are wide-open bowls, more like saucers/dishes in appearance (Fig. 2a-c). The deeper, open-mouthed vessels (Fig. 2d,e) are far more common at 28%, while those with vertical sides (Fig. 2

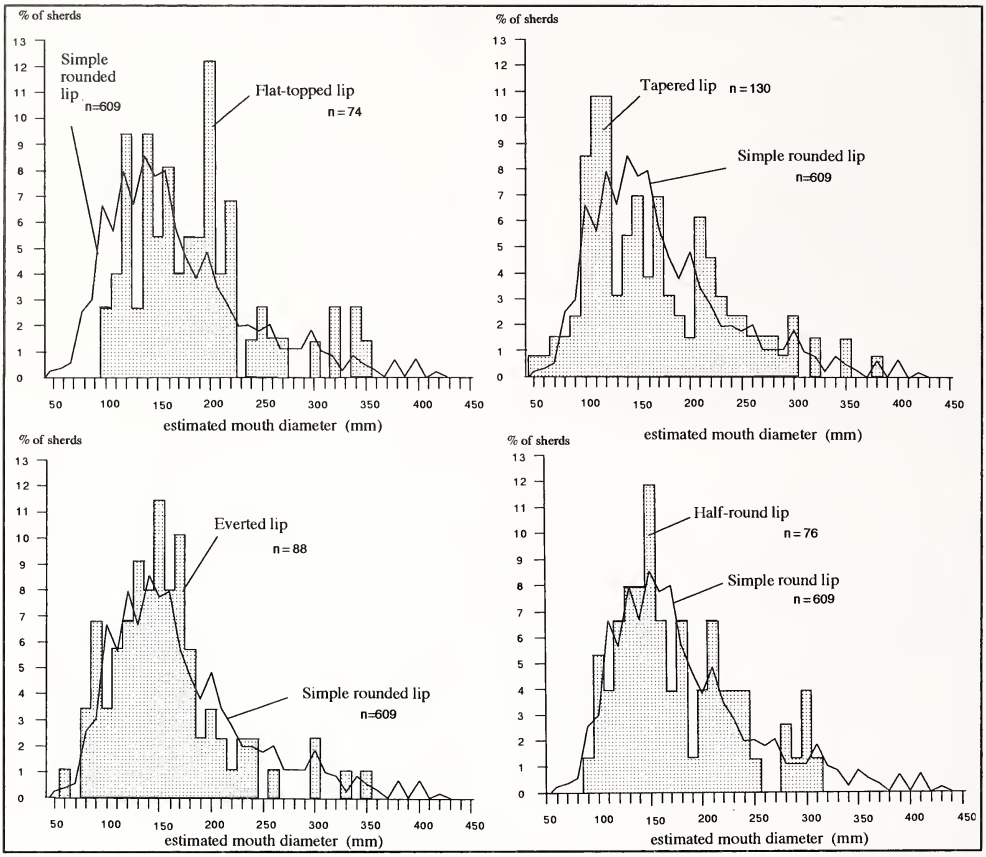

Fig. 7. Percentage frequencies of rim diameters for fibre-tempered vessels with different lip types.

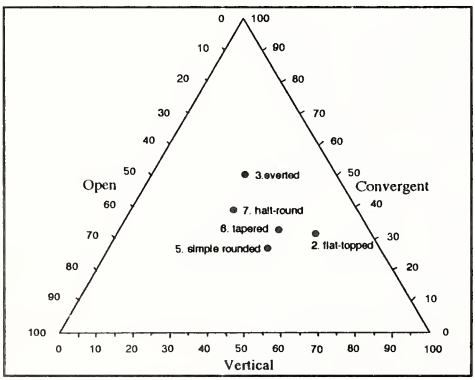

Fig. 8. Tri-axial graph showing frequencies of three rim orientations among fibre-tempered vessels with different lip types.

f,g) are indeed the most numerous at 41%. Those with convergent mouths - either pots or bowls (Fig. 2h-k) - are hardly less common at 31%. We suspect that the wide-open saucer/dish is a discrete type, but we doubt if this is so for the other three. Since the open:vertical:convergent ratio is. 3:4:3, we suspect that these attributes arbitrarily subdivide a single shape continuum.

The frequencies of different mouth diameters for wide-open bowls cannot be calculated for want of enough measurable specimens (n=14). Although most of these are at the smaller end of the size range they were not all so. The sample of open bowls contains rather more smaller specimens than the sample vertical-sided vessels, but the difference is slight. Mouth width for vertical-sided bowls is also not significantly different from that for convergent bowls. When these relationships are viewed on a tri-axial graph (Fig. 6) the size segments form a single cluster with one outlier (m4). Although m4 rims are relatively deficient in open and convergent bowls, we do not think this is enough to merit separating the m4 group as a discrete

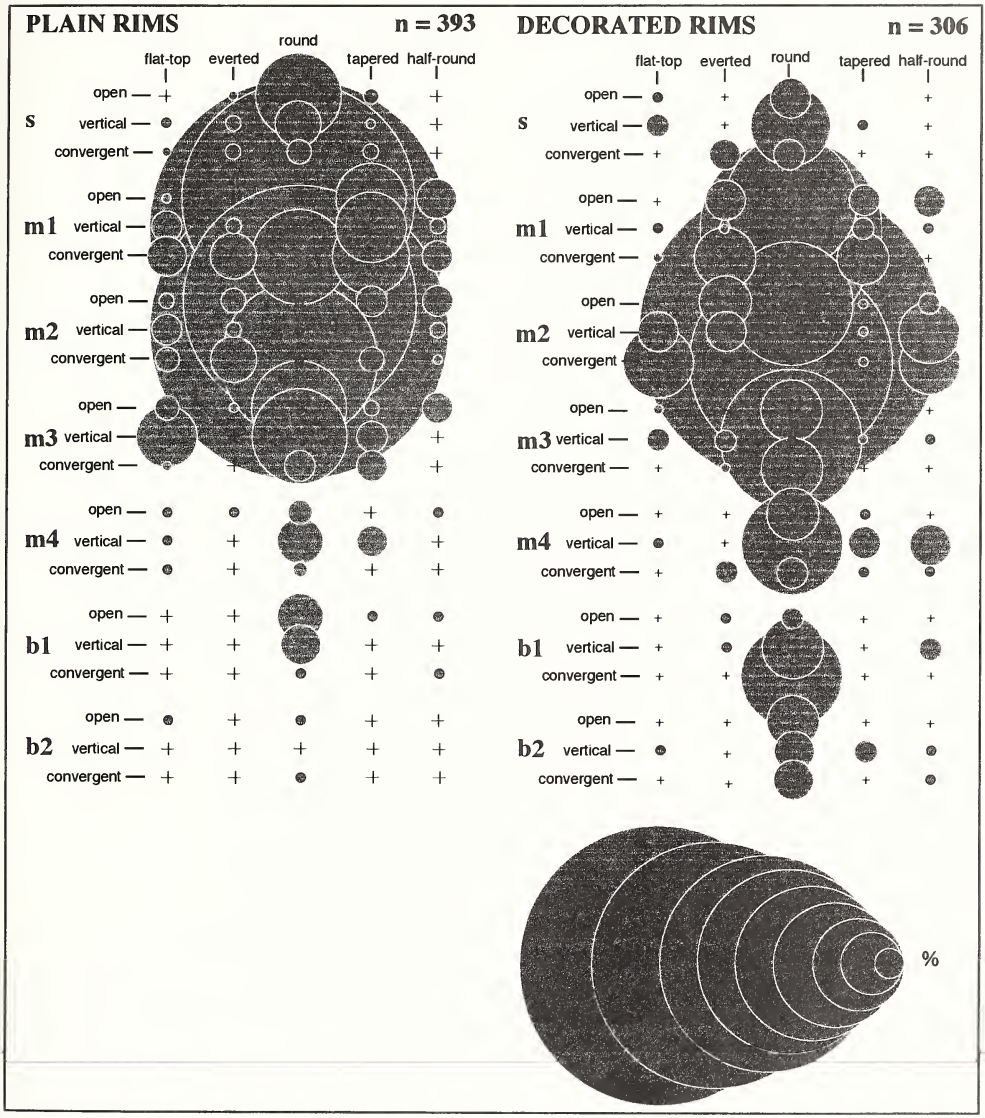

Fig. 9. Total variability between size (s to b2), three rim orientations (open, vertical, convergent) and lip type (top row) among plain rim sherds and decorated rim sherds.

type. Overall rim orientation combined with mouth diameter does not encourage us to propose further vessel categories, but only a single, highly variable class, plus the much scarcer saucer/dish form.

Lip type

The shape of the lip is preserved on almost every rim sherd (n = 1 459), no matter how small, and all eight lip types (Fig. 3) are present in the collection. Of the 40 multi-sherd vessels, three (7.5%) had sherds with different lip types on the same rim. Two more single sherds show the lip changing along the arc of the rim. Although they were excluded from the various attribute comparisons discussed here, they signal that a significant amount of

Table 1. Counts of rim sherds retaining all three attributes: size, rim orientation and lip type.

Size	Rim Orientation	Lip Type: Bevel	Flat Top	Everted	Thick Round	Simple Round	Taper	Half Round	Thick Flat
		1	2	3	4	5	6	7	8
	wide	-	-	-	-	2	1	-	-
	open	-	1	1	-	15	2	-	-
Small (s)	vertical	-	1	3	1	14	4	1	-
	convergent	-	1	5	-	7	3	3	-
	wide	-	1	-	-	1	1	-	-
	open	-	1	4	-	42	11	8	-
Med.1 (m1)	vertical	-	5	3	-	56	11	3	-
	convergent	-	6	11	-	27	15	4	1
	wide	-	-	-	-	5	-	-	-
	open	-	2	8	-	37	5	6	-
Med.2 (m2)	vertical	-	10	10	-	66	8	7	-
	convergent	2	3	13	-	40	4	8	-
	wide	-	1	-	-	1	-	-	-
	open	1	2	2	-	19	2	4	-
Med.3 (m3)	vertical	-	10	2	-	26	5	1	-
	convergent	-	5	1	-	13	6	3	-
	wide	-	-	-	-	1	-	-	-
	open	-	1	1	-	6	1	1	-
Med.4 (m4)	vertical	-	2	-	-	16	7	4	-
	convergent	-	1	2	-	5	1	1	-
	wide	-	-	-	-	-	-	-	-
	open	-	-	1	-	8	1	1	-
Large 1 (b1)	vertical	-	-	1	-	11	-	2	-
	convergent	-	-	-	-	11	-	1	-
	wide	-	-	-	-	-	-	-	-
	open	-	1	-	-	8	-	-	-
Large 2 (b2)	vertical	-	1	-	-	4	3	1	-
	convergent	-	-	2	-	5	-	1	-

within-vessel lip variation exists, which we were unable to detect in this sample of mostly single-sherd vessels.

Shortcomings notwithstanding, simple rounded rims (type 5) were overwhelmingly preferred (63%), trailed by tapered rims (type 6) at only 14%. Flat-topped rims (type 2), everted rims (type 3) and half-round rims (type 7) are present in modest, near-equal frequencies at 6%, 8% and 8 % respectively. Bevelled rims (type 1), thickened round rims (type 4) and thickened flat rims (type 8) occur as no more than a trace at 0,6%, 0,4% and 0,1% of the sample.

Measurable vessels with a simple round lip are the most numerous, providing a smoother mouth-diameter frequency curve against which to compare the other lip types. Figure 7 (top left) shows that flat-topped lips are relatively uncommon among smaller vessels, verified by the t-test comparison. The size range of vessels with an everted lip does not differ significantly from those with a simple round lip (Fig. 7 centre left). Those with a tapered lip show a possibly bimodal size distribution (Fig. 7 bottom left), but the t-test comparison shows no significant differences. Those with half-round lip do not differ significantly from the simple-round-lipped sample (Fig. 7 top right).

When lip type is combined with rim orientation, the sample sizes are inevitably much reduced. Simple round lips dominate all categories of rim orientation at about the same average frequency, and the other lip types are spread proportionately over the four classes of rim orientation in much the same way. The only notable exception is that everted rims are present in twice the average frequency among convergent mouths. When the relationships are plotted in a tri-axial graph (Fig. 8), however, type 3 is not really isolated from the other quantifiable lip types, a result confirmed by chi-square comparisons. Consequently

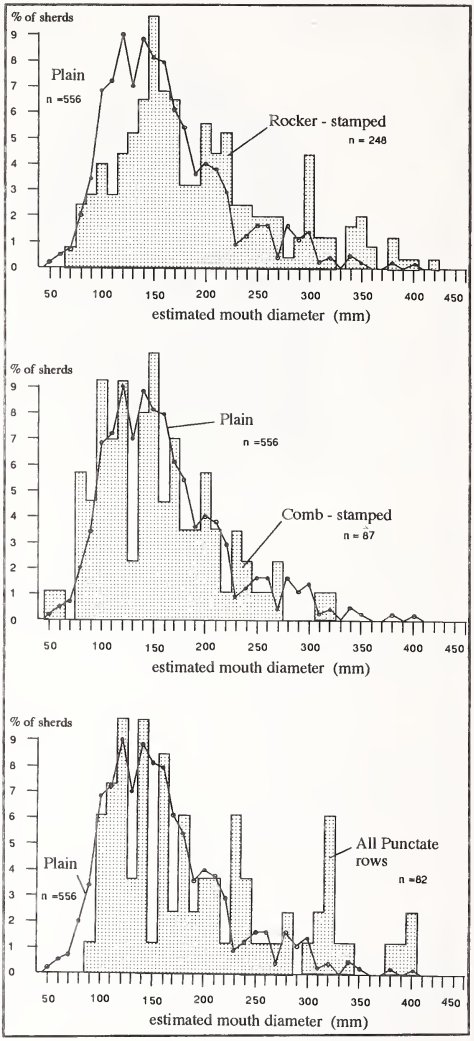

Fig. 10. Percentage frequencies of rim diameters between plain rims and rims carrying the three classes of decorative motif.

convergent-mouth vessels (pots?) with everted lips cannot be viewed as a wholly separate vessel type.

Combined attributes

Sample sizes are not much further reduced when mouth diameter, rim orientation and lip type are considered together. However, sherds retaining all three attributes must be spread among 224 cells in the table in order to cover all the possible variability. In reality, only 104 of the cells are needed to express the full range of

Table 2. Percentages of lip types for fibre-tempered plain (undecorated) rims and for rims with the three classes of decoration.

Lip	Plain	Rocker-stamp	Comb-stamp	Punctate row
1. Bevelled	0,4%	0,6%	2,2%	0,8%
2. Flat-topped	7.5%	5,1%	3,0%	3,4%
3. Everted	5,7%	12,9%	14,9%	4,2%
4. Thickend round	0,5%	0,3%	0	0,8%
5. Simple rounded	61,2%	64,1%	56,7%	65,5%
6. Tapered	18,3%	8.7%	7,4%	10,1%
7. Half-round	6,2%	8,4%	15.7%	14.5%
8. Thickened flat	0,1%	0	0	0,8%
No. of vessels	835	334	134	119

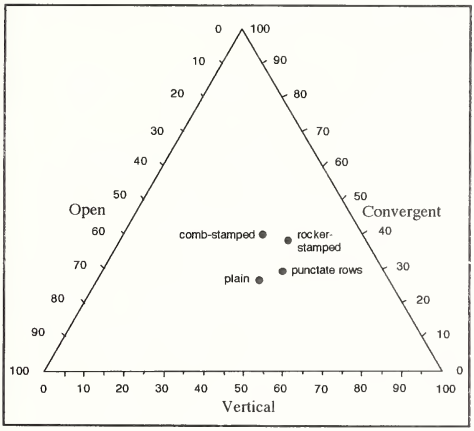

Fig. 11. Tri-axial graph showing frequencies of three rim orientations among fibre-tempered vessels with plain rims and rims decorated with each of three different motif classes.

combinations, and 32 of those contain only one vessel each (Table 1), leaving 72 cells to express the significant range of variability. The two top scoring cells are m1-m2/ vertical/simple-round. The first six ranked cells all lie within the m1-m2/simple round lip cluster. Twelve of the highest scoring cells are all within the simple round lip (type 5) row. This must reflect a single highly variable class of vessels, and it is surrounded by a thinning halo of many other combinations, all poorly represented.

COMPARISONS

Plain and decorated

When size/orientation/lip variability are examined separately for undecorated (plain) and decorated rims, a few notable differences emerge. Figure 9 uses a similar layout to Table 1, but with the (all plain) wide-open saucer/dish type omitted and the trace lip types 1, 4, and 8 also removed in order to reduce clutter.

Plain rims include significantly more round-lipped vessels in the smaller (m1) range. Either there is a class of smaller undecorated vessels present, or a class of smaller vessels with decoration on the body only, with rims left unmarked. Another lesser, but noteworthy concentration is the cluster of plain m1's with tapered lip.

The decorated sample contains a distinct group of larger vessels in the larger (m4-b2) range, mainly with round lip but present with other lip types also.
The lesser cluster of decorated s/m1/m2's with everted lip is also noteworthy. Decorated m2's with flat-top lip and with half-round lip are also concentrated.

Are these clusters associated with specific decorative motifs ? The designs used to decorate the bowls are of three broad categories: rocker-stamp, comb stamp and various punctate rows, described in detail elsewhere (Sampson 1988, Bollong 1996). When rims with the same motif category were plotted in the same manner as Figure 9, each motif category was found to be spread over all parts of the shape/size variability. No motif was restricted to a single shape/size concentration.

However, frequencies of decoration changed with rim diameter. Figure 10 (top) shows a poor match in size-distribution between plain and rocker-stamp rims, and another poor fit between plain and punctate rows (Fig. 10 bottom). By contrast the fit between plain rims and comb-stamp rims is reasonably good (Fig. 10 centre). Could this mean that those m1 plain rims, so prominent in Figure 9 (left), are really from comb-stamp vessels on which decoration was restricted to the body? If so, then plain and comb-stamp rims should also match closely in frequencies of orientation and lip type. However, Figure 11 and Table 2 does not support this outcome since comb-stamp least resembles plain in both comparisons. Thus it is very likely that there was a class of smaller, plain-rimmed (possibly entirely plain) vessels in production.

Table 2 also displays poor fits in frequencies between the three classes of decoration, and this is echoed in the comparison of mouth diameters by decoration (Fig. 10). Comb-stamp was executed more frequently on smaller vessels, while rocker-stamp and punctate rows occur on larger ones more often.

The punctate rows were executed with several different stylus shapes (Sampson 1988), but percentage frequencies of size/shape are not possible for individual stylus types because sample sizes are too small. Although vessel counts by stylus hint that a few techniques (quill, cord-impressed, round/ovoid stylus) were restricted to smaller vessels, these cases involve samples too small for us to be certain about this.

Khoi and fibre-tempered wares

Khoi ceramics are invariably found in sealed association with fibre-tempered ware in all local rock shelter deposits, and they occur alongside fibre-tempered sherds on most surface sites. Khoi vessels are mainly necked and shouldered jars, the earlier forms sometimes having spouts and bosses on the shoulder, while the later forms are usually with lugs (Sadr & Sampson in press). It is no surprise, therefore, that the distribution of the mouth diameters of necked Khoi jars is narrower than that for fibre-tempered ware (Fig. 12), the latter being mostly

Table 3. Percentages of rim sherds by orientation to the perpendicular in the Khoi ware and fibre-tempered ware.

Rim Orientation	Khoi ware	Fibre-tempered ware
Wide-open	0%	1.9%
Open	27.6%	28.2%
Vertical	33.3%	40.8%
Convergent	39.1%	31.0%
Vessel counts	243	786

Table 4. Percentages of rim sherds by lip type in the Khoi ware and fibre-tempered ware.

Lip	Khoi ware	Fibre-tempered ware
1. Bevelled	6.5%	0.6%
2. Flat-topped	13.2%	6.2%
3. Everted	9.7%	8.1%
4. Thickened Round	5.8%	0.4%
5. Simple Rounded	44.8%	62.2%
6.Tapered	8.0%	14.2%
7. Half-round	5.5%	8.1%
8. Thickened flat	6.5%	0.1%
No. of vessels	310	1 447

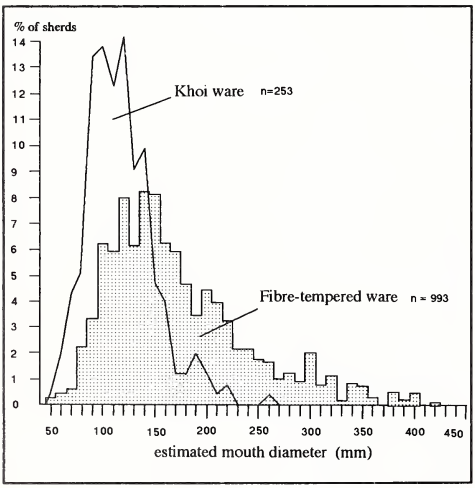

Fig. 12. Percentage frequencies of rim diameters between Khoi rims and all fibre-tempered rims.

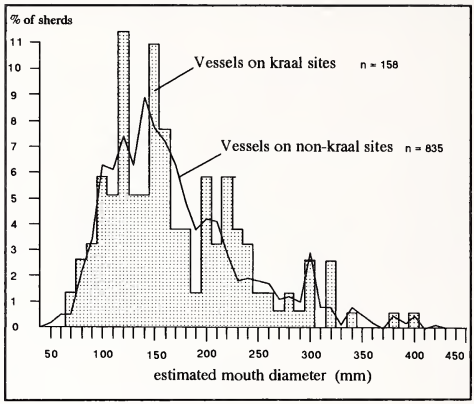

Fig. 13. Percentage frequencies of fibre-tempered rim diameters for vessels from kraal (herder) sites and non-kraal (forager?) sites.

bowls. The necks of Khoi jars are less often vertically oriented, and more frequently convergent, than are the mouths of fibre-tempered bowls. There are no shallow dish/saucer forms among the Khoi ware (Table 3). Although Khoi ware is also dominated by simple rounded lips, the other lip types all occur more frequently than they do in the fibre-tempered sample, particularly the bevelled (type 1), the thickened round (type 4) and the thickened flat (type 8) which are no more than a trace in the fibre-tempered ware (Table 4). At these frequencies, they are probably casual byproducts of manufacturing variability, whereas they constitute real (i.e. deliberately formed) attributes for Khoi ware.

Although the two wares appear to be markedly different in overall shape, there is a single fibre-tempered rim sherd with a short neck and shoulder, and there are 16 fibre-tempered body sherds with lugs - a highly characteristic feature of later Khoi ware. While these hint at the presence of lugged pots, rather than lugged bowls, we cannot demonstrate this for want of complete enough sherds which retain both the lug and rim.

Vessels from kraal and non-kraal sites

Herder sites are those with low stone stock enclosures (kraals) directly associated with the lithic surface scatter from which sherds were collected. If herders introduced fibre-tempered ware to the upper valley, and their non-herder neighbours adopted its manufacture, there is a possibility that the latter did not make the same shapes and sizes of vessel as their herder mentors. Although the size distribution of vessels on kraal sites is markedly bimodal (Fig. 13), this may be spurious as the sample is rather small. In other details vessel variability at kraal sites are almost identical to that from non-kraal sites (Tables 5 & 6).

Table 5. Percentages of rim sherds by orientation to the perpendicular, from sites with and without low stone stock enclosures (kraals).

Rim Orientation	From kraal sites	from non-kraal sites
Wide-open	1.9%	1.9%
Open	23.8%	28.0%
Vertical	43.8%	39.6%
Convergent	30.5%	30.5%
Vessel counts	105	675

Table 6. Percentages of rim sherds by lip type from sites with and without low stone stock enclosures (kraals).

Lip Type	kraal sites	non-kraal sites
1. Bevelled	0.4%	0.7%
2. Flat-topped	8.3%	5.8%
3. Everted	6.7%	8.4%
4. Thickened Round	0.4%	0.4%
5. Simple Rounded	62.5%	62.1%
6.Tapered	15.4%	14.0%
7. Half-round	5.9%	8.5%
8. Thickened flat	0.4%	0.1%
Vessel counts	253	1 194

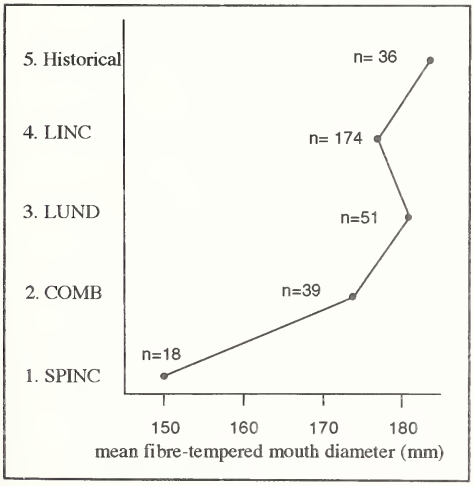

Fig. 14. Changes in mean mouth diameters through time, from earliest sites (1.SPINC) to the youngest sites (Historical).

CHANGES THROUGH TIME

Fibre-tempered ceramics were introduced into the upper Seacow valley by at least AD 450 and persisted there until about AD 1850. It is reasonable, therefore, to enquire whether changes took place in their preferred shapes and sizes over the 14+ centuries of their manufacture and use. At least four changes in Khoi vessel morphology over that time have been proposed (Sadr & Sampson in press), which encourages us to expect some parallel changes in the fibre ware.

Seriating the fibre ware by their decorations has proved to be a difficult task, thanks to low yields from rock shelter deposits, and small samples from the surface sites we wish to seriate. This task is still far from a satisfactory completion. Yields of measurable rims from the rock shelters are so small that nothing can be discerned from them about changes in vessel shape/size from stratified contexts (Bollong 1996).

Better progress has been made in seriating the Khoi ware, thanks to deeply stratified sequences with large samples from the SW Cape. Although hardly an ideal correlation (the sites are several hundred kilometers from the upper Seacow), a sequence of four stages each based on a specific Khoi vessel type can be inferred. In chronological order of appearance these are 1 - Spouted Incised (SPINC), 2 - Spouted Impressed (COMB), 3 - Lugged Undecorated (LUND) and 4 - Lugged Incised (LINC). Most surface sites contain only one of these types, suggesting relatively short occupation spans. It follows that the fibre-tempered rims from such sites can be seriated by their Khoi associations.

In all the rock shelter deposits, Khoi ware disappears from the sequence immediately below the first European artifacts. In the historical levels, only rocker-stamp and infrequent small spatulate rows occur on fibre-tempered sherds. It is likely, therefore, that surface sites with no Khoi and only rocker/ small spatulate on fibre-tempered sherds should be relegated to the end of the sequence.

The samples of measurable rim sherds from sites of SPINC, COMB, LUND, and Historical ages are too small to generate frequency distributions, so mean mouth diameters were plotted instead. Overall, there is an increase in mean diameter with time (Fig. 14), but the change between COMB to Historical is too slight and overlapping to be conclusive. When we consider that older, larger rims would break down into unmeasurable pieces, this could be the cause of the observed trend. Parallel size increases also occurred in Khoi vessel mouth-width (Sadr & Sampson in press), so the same age-attrition process could be at work on that sample as well.

Frequencies for fibre-tempered rim orientation and lip type were plotted in the same sequence, but absolutely no trends in the data could be discerned.

SPATIAL PATTERNING

Two thirds of the sites used in this study (Fig. 4) produced only one or two rim sherds each. Viewed against this background, those rare sites with exceptionally high yields of rims representing different vessels (Fig. 15) need to be explained. Why were there so many fibre-tempered vessels at these camps?

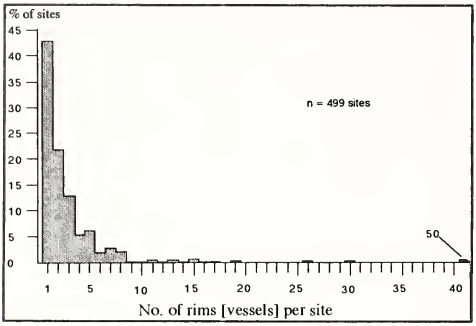

Fig. 15. Percentage frequencies of sites yielding increasing numbers of fibre-tempered vessels.

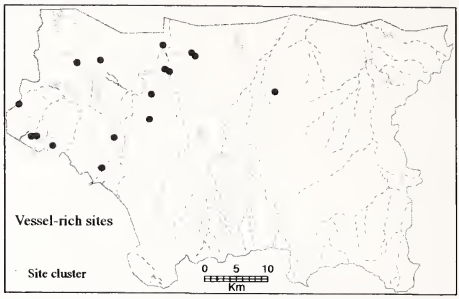

Fig. 16. Sites yielding nine or more fibre-tempered vessels in the upper Seacow valley.

In Fig. 15 site counts drop to near-zero above eight vessels/site. Sites with nine or more vessels are sharply restricted to the western drainages of the upper Seacow, with a solitary outlier in the central drainage (Fig. 16). The spacing between the sites is remarkably even, usually with one vessel-rich site per site cluster. Exceptions occur in three clusters where pairs of vessel-rich sites are immediate neighbours. None of these vessel-rich sites is especially large, several of them have kraals, and all 18 yielded at least some Khoi ware.

Previous studies point to herders penetrating first into the west part of the upper valley, then spreading later to the center and eastern parts. If the vessel-rich sites were among the first to be settled by incoming Khoi herders, then they could have been occupied for longer than any sites from other site clusters, hence they accumulated more rims with time. The trouble with this scenario is that only three of the richest sites can be shown (by their Khoi markers) to be multi-stage occupations. If the others were single stage occupations - one is COMB, two are LUND and several are LINC sites -- alternative explanations should be entertained.

Instead, could these vessel-rich sites be short-term camps where potters were especially active? If so, then we are obliged to conclude that certain vessels were not moved very far from the places where they were made - an improbable scenario if we accept that the Bushmen and their hunter-herder forbears were highly mobile. One test of this 'no-dispersal' proposition may be provided by the distributions of those scarcer vessel shape/size combinations, i.e the specimens smaller or larger than the popular m1-m3 size range with lips other than the common simple rounded profile (type 5). These are the low-frequency occurrences around the fringes of the diagrams in Fig. 9. If these oddities were being made by individual potters, they might serve as markers for a 'no-dispersal' scenario. The expectation is that odd size/shape vessels would not be randomly distributed across the upper valley.

Indeed, small vessels (s in Fig. 5) occur in tight groups of 2-4 neighbouring sites within several site clusters -- too many to be dismissed as random chance (Fig. 17 top). Furthermore, small vessels with open rim orientation are concentrated in a broad band of sites (Fig. 17 top-centre) which also hints at limited distribution. Again, when the enormous b2 vessels are mapped by lip type, pairs of vessels with the same lip profile are seen to come from adjacent sites (Fig. 17 bottom centre). Even more striking is the distribution of large b1-size vessels, when mapped by lip type. Besides pairs of sites with the same lip profile, there is a marked concentration of large vessels with tapered rims (type 6) in the central drainage (Fig. 17 bottom). These, too, hint strongly at the limited distribution of unusual vessel types, perhaps produced by individual potters. This might also explain a tight cluster of the rare fibre-tempered lugs, shown in Fig. 18.

SUMMARY AND CONCLUSIONS

The observation by Lichtenstein that bowls of the Seacow River Bushmen were 'clumsily formed' (Plumptre 1815 II:76) is in large part confirmed by our results in that they show the rules for bowl construction were quite lax. Probably about one-fifth of all bowls produced had less than round circumferences and uneven modelling of the sides and lips. Most specimens fall between 100-220 mm diameter (m1-m3 size range), finished with a simple rounded lip, but sides were variably shaped. Beyond this central, fuzzy-edged 'norm', however, there is a thin halo of other variations in size, rim orientation, and lip type. Parts of this halo coalesce in ways that suggest the presence of scarcer vessel classes. Of these, the undecorated, mostly small, wide-open 'saucer/dish' is most distinct. Next is the convergent-mouth 'pot' (?) with everted lip, mostly of m1-m2 size, but this grades imperceptibly into the main bowl form. A fuzzy gradient also separates the tapered-lip m1-size bowl from the dominant type.

No decorative technique is peculiar to any of these 'types', but different frequencies of decoration occur along the size gradient of the central bowl 'norm'. Smaller bowls were more often left undecorated, the exceptions being more likely to receive a comb-stamp finish. By contrast,

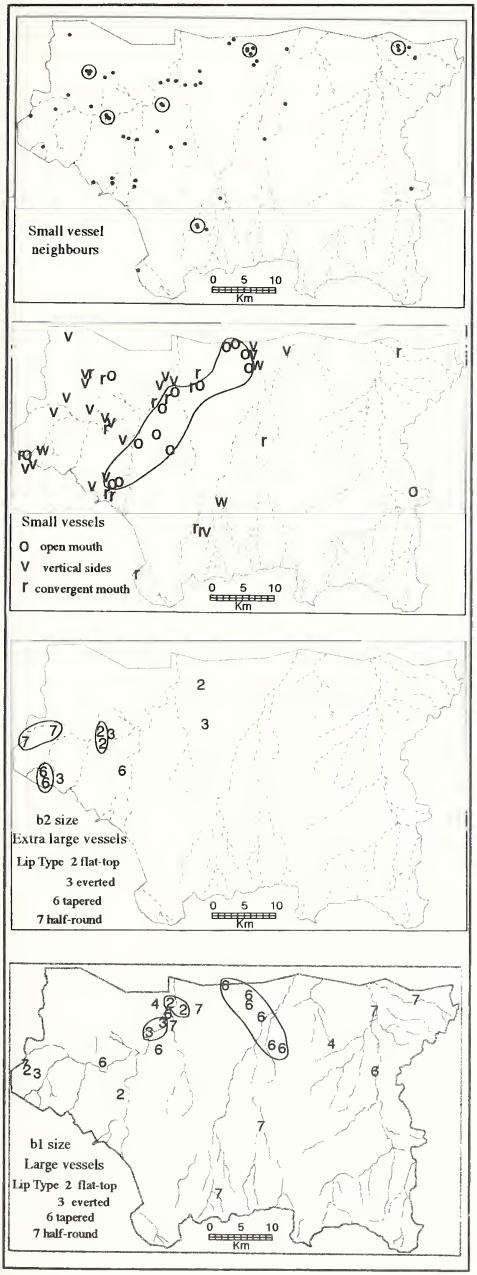

Fig. 17. Distribution maps of the scarcer small and large vessels, showing specific attributes. Clusters of vessels from contiguous sites are circled.

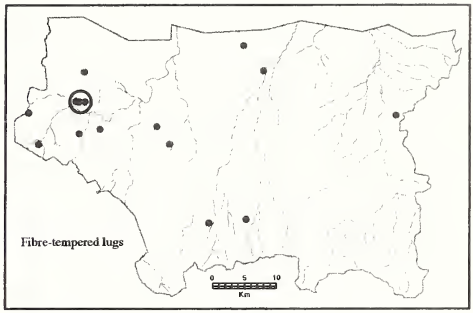

Fig. 18. Distribution of fibre-tempered lugs. The circled group denotes neighbouring sites.

most large vessels were decorated, but were more likely to be finished at the rim with rocker-stamp or punctate rows.

There are hints in our data that overall vessel size increased with time, but so many doubts (relating to sample sizes, age-attrition of large vessels, and chronology) surround this observation and we remain unsure how much credence it deserves. The fact that Khoi vessels were following the same trend is intriguing, but age-attrition may be the culprit here too.

Khoi ware differs markedly from fibre-tempered ware in the distribution of all the size/shape attributes we examined. This reinforces all prior observations that the two wares differ in clay sources used, in the tempering added to the fabric, and in the finishes and decorations applied. There is remarkably little support from any source of ceramic data, other than the rare fibre-tempered lugs, that the two pottery traditions were merging or hybridizing through time. This separation persisted in spite of their continued association on hundreds of sites over at least 14 centuries. As they stand, these results present a challenge to the notion that herders and foragers were gradually integrating during prolonged sympatry.

It is hardly surprising, then, that we find no difference between the ranges of sizes and shapes of fibre-tempered vessels from herder sites and from the surrounding non-herder sites. If resident foragers at first obtained fibre-tempered vessels from incoming herders, later learning to make their own ceramics, we have uncovered no clues that they made their own any differently from their purported herder-donors.

A rival scenario should now be entertained: that herders arrived with only Khoi pottery, and that resident hunter-gatherers adopted only the idea and basic technology of potmaking. Instead of churning out copies of Khoi pots, the latter made fibre-tempered bowls of their own rather ungainly, but presumably functional style. In historical times, these came to be identified with 'Bushmen' in the South African interior.

An unexpected outcome of this study is that several 'marginal' shape/size categories, i.e. specimens larger or smaller than the central 'norm' (some with specific lip

profiles) are distributed in tiny, restricted patches on the landscape that suggest they were the products of individual potters or potting groups, not part of some wider tradition. Ironically (after so much study), such spatial patterning does not occur among vessel decorations, most of which are apparently too widespread to provide such individual or group markers. An important implication of these findings is that some fibre-tempered vessels did not move very far from their place of manufacture, a curious conclusion considering that they were made by highly mobile herder-foragers. Clay-sourcing of the Khoi ceramics by XRF hints at the same pattern (Bollong 1996).This raises the distinct possibility that vessels were not habitually carried from site to site, but were left behind when the group decamped. While this makes sense for the very large vessels, reasons must be sought for why it would apply to some very small ones also. Whatever those reasons, there are grounds for supposing that many of the specimens falling outside the 'norm' of bowl production reflect variability between individual potters rather than ethnic signatures of style.

ACKNOWLEDGEMENTS

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RE-DISCOVERING THE ROCK ART OF THE LIMPOPO-SHASHI CONFLUENCE AREA, SOUTHERN AFRICA*

EDWARD B. EASTWOOD

Palaeo-Art Field Services, P.O. Box 168, Louis Trichardt, 0920

E-mail: rockart@mweb.co.za

and

GEOFFREY BLUNDELL

Rock Art Research Centre, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg

E-mail: rockart@cosmos.wits.ac.za
Web: Http://sunsite.wits.ac.za/raru

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ABSTRACT

Although rock art images from the Limpopo River Valley were first mentioned in 1888, work on this aspect of the archaeological record of the area has been sporadic during this century. Since the early 1990s, however, Palaeo-Art Field Services, a rock art recording team based in Louis Trichardt, has surveyed the Limpopo-Shashi Confluence Area on both the South African and Zimbabwean sides. They have raised the number of documented rock art sites from 40 to 120. This paper presents some of the results of this work. The paper does not set out to provide comprehensive arguments for the interpretation of the imagery; rather, it aims to re-introduce the art to a contemporary audience and point to some interesting features of the art of this region while suggesting possible interpretations as well as avenues for further research.

INTRODUCTION

As research shifts and changes over time, different areas on the southern African landscape come into prominence while others are relegated to the periphery of archaeological consciousness. A case in point is the rock art of the Limpopo-Shashi Confluence Area (LSCA). During the 1960s and 1970s the rock art of this area frequently featured in academic discourse (see Schoonraad 1960, 1963; Willcox 1963; Pager 1973, 1975a, 1977). Then, from the 1970s onwards, there was declining interest in the rock art of this region; instead, research concentrated on the south-eastern mountains, the south-western Cape, the central interior of South Africa, the Matopos of Zimbabwe, and areas in Namibia. Recently, Palaeo-Art Field Services has undertaken extensive surveying of the LSCA for rock art sites.

Discovering rock art sites in the LSCA is no easy matter for it is a vast expanse of wilderness that forms the boundaries between Botswana, Zimbabwe, and South Africa (Figs 1 & 2). The area is characterised by roughly parallel series of ridges running along the Limpopo River. These cream-coloured ridges belong to the Tshipise Member of the Clarens Formation of Karroo sandstone. It is in these ridges that shelters - formed by water erosion or by subsidence from vertical and horizontal joint planes - with rock art are found. Both paintings and engravings occur in these shelters, interestingly, often in the same shelters. Engravings are also found on exposed sandstone surfaces or, in one case, on a horizontal bed of metamorphic rock.

This topography supports a rich plant life. Riparian forest gives way to a mosaic of mopane woodland and scrub interspersed with mixed Bushveld woodland. In turn, this plant life supports a remarkable diversity of animals. Pools at the junction of the two seasonally flowing rivers provide a perennial water-source for the wild animals of this region, local human communities, and their livestock.

This abundance and diversity of natural resources has

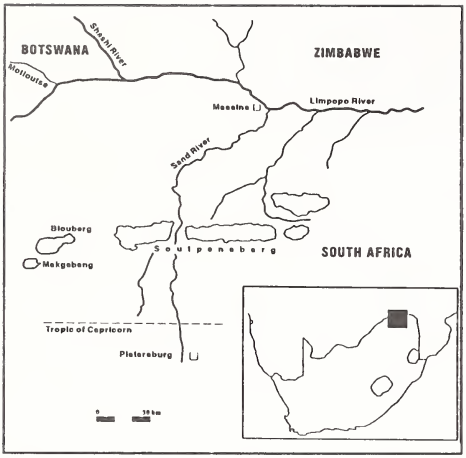

Fig. 1. Map of Limpopo-Shashi Confluence area (LSCA). The study area is shaded.

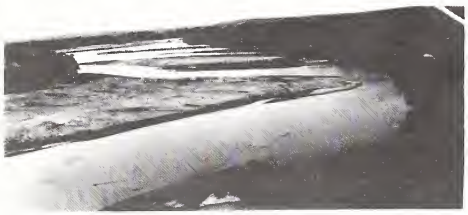

Fig. 2. Aerial view of the Limpopo river near its confluence with the Shashi. This photograph was taken in February towards the end of the rainy season when the water begins to recede.

long attracted human settlement. Indeed, the Iron Age archaeological sequence of the LSCA is relatively well known. At present, the archaeological evidence suggests that there was a succession of occupation beginning with people of the Zhizo tradition, followed by proto-Shona traditions such as the Mapungubwe, Zimbabwe and Khami cultures, and more recently by Sotho-speakers and, later, Venda groups (Hanisch & Fish 1995).

Although the succession of Late Iron Age groups who occupied this area is well known, the role of the Late Stone Age people in these successive occupations is not. In fact, very little work has been conducted on the Late Stone Age sequence. What has been done, however, suggests that the hunter-gatherers of this region did not live their lives untouched by the Late Iron Age peoples (Simon Hall, pers. comm.). Contact is evident between hunter-gatherers and Early Iron Age farmers from about AD 300 in the nearby Soutpansberg (Steyn *et al.* 1994; Fish 1995; Hanisch & Fish 1995).

This contact with agro-pastoralists does not appear to have always been beneficial to the hunter-gatherers. During the nineteenth century, for example, many of the region's hunter-gatherers seem to have fallen victim to the war between the Matabele and Tswana (*e.g.* Wood 1893; see also Walker 1991:187). This is archaeologically known as the Refuge Period (*e.g.* Hanisch & Fish 1995). After this period of conflict, very few San groups were reported by European travellers in this disputed frontier territory (see, Elton 1873; Selous 1908).

To what extent the Refuge Period affected the hunter-gatherers is, however, difficult to know. This is because very few early travellers ventured into the LSCA until the 1890s. At the beginning of this century, however, Samuel Dornan (1925:66-67) reported that groups of Hietchware San were still near the LSCA, and that some lived in Tswana villages along the Motloutse and Shashi Rivers. Indeed, San hunter-gatherers were still living in the LSCA well into this century; according to Venda and North Sotho people living in south-western Zimbabwe, the San finally moved away from the LSCA in the 1950s after white farmers settled in the region (Eastwood & Cnoops 1998; *cf.* Van der Ryst 1998). They still live along the Shashi River in Botswana but have largely lost their identity and customs (Walker 1991). Considered to be Eastern Khoe-speakers, probably belonging to the Hietchware group or Eastern Khoe (Barnard 1992), the San who live along the Shashi are thought to be related to the Central San language family of Tshu-khwe-speakers which includes the G/wi and Nharo (Bleek 1928; Westphal 1963).

The paucity of information on hunter-gatherers of the LSCA is unfortunate because at least 95% of the rock art images documented since 1992 are almost certainly San hunter-gatherer in tradition. Some images appear to have been the work of Bantu-speaking farmers. These are finger paintings of zoomorphic and geometric motifs. In addition, there are finger paintings in red and/or white pigments composed entirely of geometric forms and finger dots, whose authorship is uncertain. Because these images represent such a small sample of the total thus far recorded and because research on them is still nascent, we discuss only the San hunter-gatherer rock art in this paper. As we have mentioned, this art comprises both engravings and paintings. We deal with each in turn, drawing on data collected from 85 sites in the area. Data from the remaining 35 sites has not yet been processed.

We begin by discussing previous and current research on rock art in the LSCA. We then describe some of the central themes in the hunter-gatherer art. We argue that this rock art is unique in several ways, and differs from the art of the Matopos to the north in Zimbabwe, and from that in the south-eastern mountains and south-western Cape in South Africa. As we proceed, it will become clear that the rock art of the LSCA does indeed represent a clearly defined subregion. Current surveys

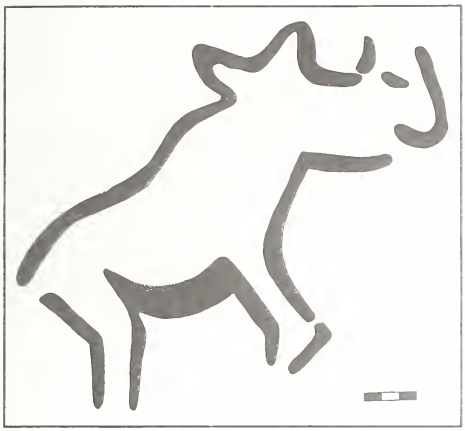

Fig. 3. Deeply incised and heavily weathered engraving of rhinoceros. Scale in centimetres.

have shown that the art is far more widespread and complex than was previously imagined. In this paper, we describe some of the complexity of the rock art of the LSCA. It is not intended to be an exhaustive account; rather, it aims to present new material from this region and thereby encourage further research and debate.

PREVIOUS AND CURRENT RESEARCH

The first person to publish some of the rock art from the LSCA was Andrew Anderson who journeyed through the area in 1866 and illustrated rock engravings that he found there (Anderson 1888 *cf.* Mason 1962:22). Little mention of the rock art of the region was made after that time until 1952 when Clarence van Riet Lowe published a catalogue of rock art sites in South Africa; he listed nine. It was another eight years before Murray Schoonraad undertook the first serious investigation of the art. He published a brief preliminary study of nine sites in 1960. In addition to illustrating engravings, Schoonraad pointed out that there were also paintings in the area. These included depictions of fish and birds, as well as stylised female human figures and, importantly, enigmatic Y-shaped motifs.

Though intrigued by the Y-shaped images (see, for example, Sunday Times 1957), Schoonraad, unfortunately, did not pursue research in the area. In 1963, Alex Willcox described the co-occurrence of paintings and engravings at one site (see also, Willcox & Pager 1968 for a description of more engravings in the area). Except for a mention of the paintings by Cran Cooke and H. Simons in 1969, when they excavated small areas of Mpato Shelter in southwestern Zimbabwe, little work on the rock art was done after Willcox until the early 1970s. At this time Harald Pager conducted fieldwork on the South African side of the river, recording selected images from 36 sites (Pager 1973, 1975a, 1977). After Pager moved his recording programme to the Brandberg in the late 1970s, there was another pause in research for about a decade.

This interlude ceased in the 1990s when the Soutpansberg Rock Art Conservation Group produced three unpublished reports on five properties in South Africa (Eastwood & Cnoops 1994a; Eastwood *et al.* 1994; Eastwood & Fish 1995). Palaeo-Art Field Services, a professional survey and recording group, developed out of this earlier, largely avocational, organisation. Palaeo-Art Field Services persevered with work in the LSCA by recording art on two properties in Zimbabwe near the confluence (Eastwood *et al.* 1995). Since then, this group has surveyed a further 10 properties on the South African side of the Limpopo River (Eastwood *et al.* 1997, 1998; Eastwood & Cnoops 1998a, 1999). In addition, previously documented sites have been re-visited. Although work in the region is continuing, the number of located sites represents a significant representative sample from which to make general observations about rock art in the region.

THE ROCK ENGRAVINGS

We recognise five categories of engravings: schematic designs, animal motifs, animal spoor, cupules, and cut marks (Figs 10A & 10B).

Schematic designs

These vary from finely incised patterns to deeply incised grids, crosses, and meandering lines. They are frequently found near Iron Age sites. Sometimes they are near grain-bin remains in isolated shelters where cereal grain was secreted during the Refuge Period. Although difficult to interpret, it has been suggested that some of these designs may represent protective marks or signs of ownership (*cf.* Cnoops & Eastwood 1995).

Animals

The most striking engravings are those depicting animals. Most notably, there are several engraved giraffe in the region. One of these is the famous Mtetengwe petroglyph that is 2,3 metres in length. Elizabeth Goodall and Roger Summers first reported this engraving in 1951. Other engraved animals in the LSCA include rhinoceroses (Fig. 3), a zebra, a kudu, a gemsbok as well as animals of indeterminate species.

Spoor

Engraved animal spoor are found in five shelters (Fig. 4). Identifiable tracks include those of zebra, kudu, elephant, and impala. Some of these images were very carefully pecked out and then, most unusually, polished. They are often depicted together with cupules and slash marks. Their symbolism is unknown, but it is likely that they had complex symbolic associations (Ouzman in prep.).

Fig. 4. Engraved antelope spoor on vertical rock surface: species indeterminate. Scale in centimetres.

Cupules

The cupules constitute the most numerically significant engraving category. Most of these are randomly situated on vertical or off-vertical rock faces (Fig. 5). They are also found on horizontal surfaces and boulders. Generally, the diameters of the cupules vary between 10 to 60 mm. Current views suggest that the production of cupules worldwide was more symbolic than functional, although specific meanings and functions no doubt varied from place to place (Taçon *et al.* 1997).

Cut Marks

Another enigmatic petroglyph type is the 'cut mark' (Fig. 6). These are, like the cupules, widespread and they are found in about a fifth of the recorded shelters. They are also found in shelters where there is no other form of rock art. In all cases of superpositioning that have been recorded, paintings have been found over, not under, the slash marks. It has been suggested that these grooves were the result of functional activity such as the sharpening of metal blades. This is, however, unlikely, as this procedure would in fact dull the edge of an iron artefact. Another suggestion is that they were used to shape bone points. This is also an unlikely explanation because the relative softness of bone would not make much impression on the hard quartzitic sandstone on which most cut marks are found. Moreover, many of the cut marks are situated high above the present floor of the shelter; in some cases, they are as much as four metres above ground level. Although it is possible that the ground level has been much eroded in certain places since they were made, in other cases it seems that they were intentionally placed this high. It is more likely that these marks were not the product of some practical function, such as sharpening, but were, rather, part of a symbolic art tradition.

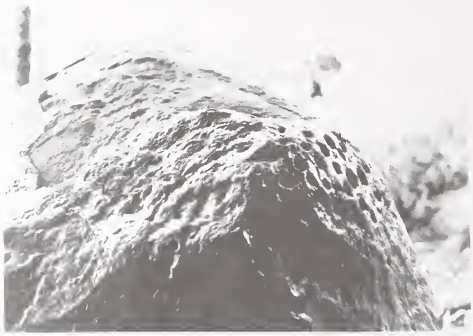

Fig. 5. Typical cupules on boulder in a painted shelter. The silica skin over them may indicate great age.

THE ROCK PAINTINGS

We consider three major categories in the paintings: animals, human figures, and Y-shape/spread-eagled motifs (Figs 10A & 10C).

Animals

This category of image includes depictions of both indeterminate antelope and recognisable species, such as kudu, as well as other animals, such as giraffe and elephant (Fig. 10D) (*cf.* Pager 1975a; Eastwood *et al.* 1995).

Depictions of antelope, as in most areas in southern Africa, are numerically dominant over those of other animals (Fig. 10E). In addition, as in most areas in southern Africa, 75% (n=187) of these images are of indeterminate species (see, Eastwood *et al.* in prep. on possible exaggeration of this category in rock art research). Kudu are the most commonly painted identifiable antelope, and they comprise 15% (n=74) of all recorded antelope. Other species-specific antelope, such as tsessebe, eland, impala, widebeest, reedbuck and sable collectively make up 11% (n=64) (Fig. 10E). It is nevertheless likely that many of the indeterminate antelope depictions represent kudu, as many of the images possess at least one of its defining morphological characteristics. We now turn to those characteristics and to possible reasons for the numerical prominence of depictions of kudu.

Kudu are usually depicted in red pigment and are identifiable by their large, squarish ears, shoulder humps, robust muzzles and long necks. There are also many finely detailed bichrome and polychrome examples (Fig. 7); the polychrome images are usually larger than monochrome ones. The numerical dominance of kudu in the art and the elaborate treatment accorded to them,

Fig. 6. Cut Marks such as these adorn the shelters of the Limpopo-Shashi Confluence. More commonly than these rounded examples, they are usually V-shaped in cross-section.

suggest that this animal played a role in the art similar to that of the eland further south (Vinnicombe 1972:198; see also Walker 1996: 68). One interesting aspect of the kudu that may relate to its prominence in the art is its sexual ambiguity. Female kudu sometimes bear horns (Smithers 1983:666). This ambivalence may have placed the kudu as a symbol of liminality, as a mediator between the sexes and between ordinary reality and non-ordinary experience. Certainly, ambiguous animals are often chosen as focal symbols throughout Africa (see, Douglas 1957), and ambiguity plays an important role in San rock art (Lewis-Williams 1981; Dowson 1992; Solomon 1992; Eastwood & Cnoops in prep.). Whatever the reasons, the frequency of kudu depictions in the art of the LSCA and relative absence of eland, suggest that this art was conceptually closer to that found farther to the north in Zimbabwe û where kudu are predominant - than to that in the south-eastern mountains and south-western Cape.

After kudu the most numerous animal species depicted is the elephant. Elephant make up 13% (n=56) of animal depictions (n=506) (Fig. 10D). Most commonly, elephant are portrayed in black pigment and do not have ears and tusks. At least 60% of these images have red dorsal lines.

The red dorsal line is also found on depictions of giraffe, another numerically significant image. An earlier survey by Pager (1975a) on the South African side of the Limpopo River revealed that images of giraffe comprised 16% of all animal depictions. Figures from more recent surveys, both north and south of the river, however, show that they comprise only 7% (n=31) of all animal imagery (see, Fig. 10D; see, Eastwood *et al.* 1995 for figures on north side of river). These are preliminary figures and will possibly change when data from recent surveys are fully processed and images from both sides of the river are calculated together. Most depictions of giraffe are red monochromes but there are also several elaborate polychromes, some of which have red dorsal stripes extending from the base of the head to the base of the tail (Fig. 8). This line may refer to the supernatural potency (*n/om*) of the animals (Eastwood in press); in the Kalahari, the giraffe is considered to be an especially potent animal, and it plays an important role in the ritual and folklore of many San groups (Marshall 1969; Biesele 1993).

Other painted animal species include rhinoceroses, lions, leopards (and indeterminate felids), baboons, buffalo, warthogs, antbears, birds, jackals, hippopotamuses, cyprinid and mormyrid fish, zebras, wild dogs, hyenas and mongooses (Fig. 10D). These collectively make up 17% (n=88) of all animal depictions. In addition to these animals, locusts are depicted at one site and fat-tailed sheep at four sites. It is important to realise that the species diversity, both amongst the antelope and amongst animal imagery in general is high given such a small study area (*c.* 1 200 square kilometres). In the south-western Cape and the south-eastern mountains the diversity of species depicted seems to be less than that in the LSCA. In those other areas, species diversity appears to be closely related to idiosyncrasy and artistic individuality (Dowson 1988). The high level of species diversity in the art of the LSCA suggests that in this region, depiction of diverse species may have been a 'cultural' practice rather than a result of idiosyncracy. Nevertheless, most rock art sites exhibit only a few species; it is only at a few sites that a wide variety of animals is depicted, and this is a feature of the area that requires further research.

Human Figures

Both males and females are represented in the art of the region. Typically human beings are painted in linear or linear-like arrangements. Many of the figures in these groups are apparently unsexed (Fig. 10F). Indeed, 47% (n=274) of all human figures so far documented in the LSCA do not have primary sexual characteristics (penises for men and breasts for women). Many of the indeterminate human figures may, however, be male because they are slender and upright, as are those that are clearly male (*cf.* Solomon 1992). When identifiable, women are usually shown with reverse articulation of the legs, exaggerated lordosis of the spine and, frequently, breasts attached to the thorax by a 'pedicel' (Fig. 9).

Very importantly, these depictions of women constitute 31% (n=182) of all human beings; males account for the remaining 22% (n=128). This is an extremely high percentage of women when compared to other rock art areas of the subcontinent. In the south-eastern mountains, for example, women make up as little as 2% of the images of human beings in certain areas (Vinnicombe 1976:363) and as much as 14.8% in others (Pager 1975b:40). Similar low percentages are recorded from other areas. In the Cederberg, women constitute 9.6% of human figures in some places (Halkett 1987); at Tsodilo Hills they make up 3.2% (Campbell *et al.* 1994:145) and in the nearby western Soutpansberg, they make up only 1% (Eastwood & Cnoops 1994b:44).

Just as important as the high percentage of women in the LSCA rock art, is the observation that they are

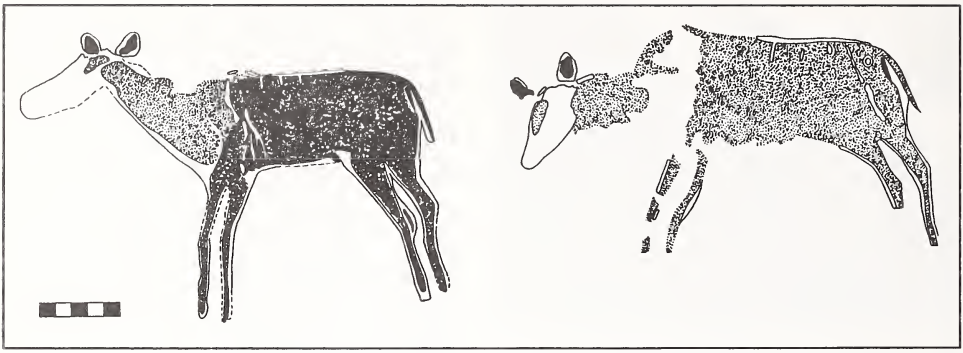

Fig. 7. Two polychrome kudu cows. The right-hand animal is intypical head-down posture. Outline represents white, black represents red, heavy stipple represents dark yellow, light stipple represents light yellow. Scale in centimetres.

Fig. 8. Two polychrome giraffe and a woman. Note the red dorsal stripe on the giraffe on the right. Outline represents white, black represents red, heavy stipple represents light red, light stipple represents yellow. Scale in centimetres.

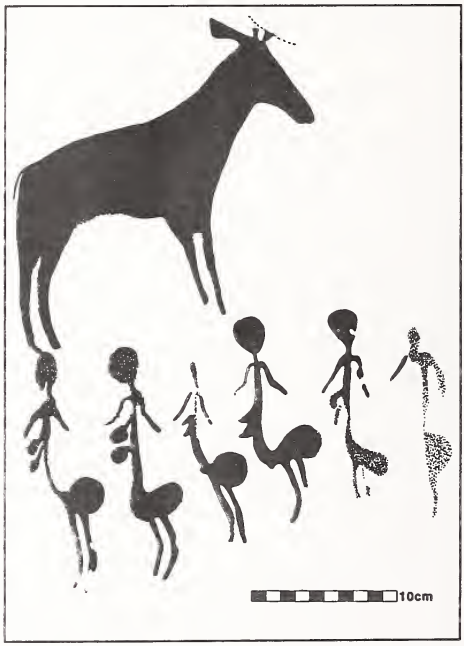

Fig. 9. Alcelaphid antelope with row of women. Typical of depictions of women in the Limpopo-Shashi region, they have large heads, exaggerated buttocks, lordosis of the spine, pedicel breasts and reverse articulation of the legs. Black represents red. Scale in centimetres.

seldom depicted together with men. There are some paintings of a single male juxtaposed with a single female, but for the most part people are portrayed in single-sex groups. The high proportion of women in the art and the separation of men and women into distinct groups suggests that gender division may have been one of the primary underlying structures of the art (Eastwood & Cnoops in prep.).

Processional groups of men or women sometimes suggest dancing but for the most part they appear simply to be walking. Because San rock art throughout southern Africa has been shown to be more than mere narrative,

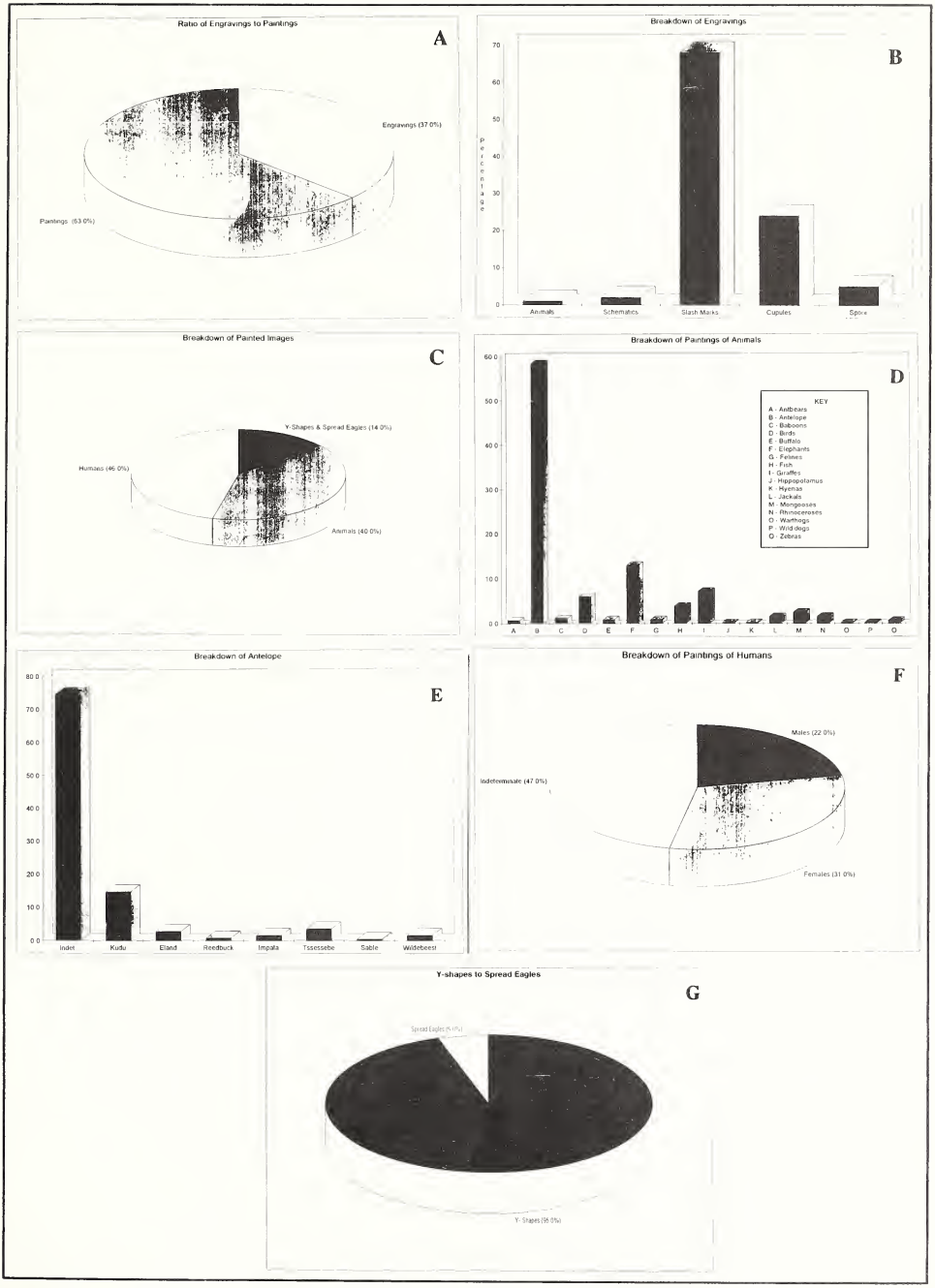

Fig. 10. Graphed results of quantitative studies of the rock art at 85 sites in the Limpopo-Shashi Confluence.

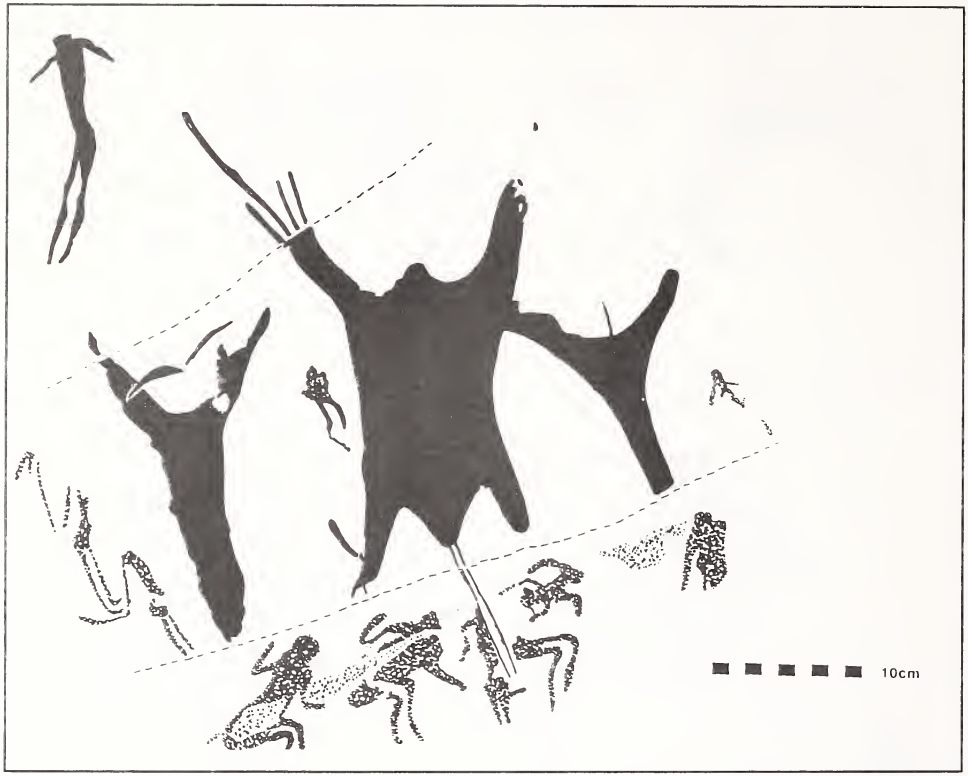

Fig. 11. Typical Y-shapes and a 'spread-eagled' motif. Black represents red, stopple represents green. Scale in centimetres.

it is highly likely there is more to the LSCA paintings of human beings than meets the eye. In addition to possible 'dance scenes' of some of these processions there are three possible hunting 'scenes', but non-realistic elements in these suggest that they may also be explained in a manner other than narrative (Eastwood & Cnoops 1998b; Eastwood in press).

Y-shaped/spread-eagled motifs

The most intriguing and enigmatic images in the art of the LSCA are Y-shaped motifs. These images occur in over 60% of recorded sites (n=85). They are often found in a continuum of forms ranging from a simple Y-shape to a form that is best described as a 'spread-eagled' motif (Fig. 11). 'Spread-eagled' images resemble stretched out animal skins. Definitive 'spread-eagled' motifs are found in only about 5% of shelters (Fig. 10G). They are often juxtaposed with Y-shapes. The continuity in form between Y-shapes and 'spread-eagled' figures, however, strongly suggests that they comprise a class of image, even though their significance may not be identical.

In the past, the Y-shapes were interpreted as fish traps (Pager 1975a), but this explanation is unlikely because they are never immediately juxtaposed with depictions of fish. We now believe that these depictions represent items of San clothing (Blundell & Eastwood in prep.). We do not understand why items of clothing should have been painted, but the recognition of these images as such, and not as fish traps, opens new avenues for research.

CONCLUSION

Although brief, this 're-discovery' of the hunter- gatherer rock art of the LSCA has shown that the art is far more widespread, diverse, and complex than has hitherto been suspected. Three very important features of the art that hold possibility for further research and that could shift the way in which San rock art throughout the subcontinent is perceived are:

1. The co-occurence of engravings and paintings in the same area may shed light on the relationship between the two traditions - an aspect of the art that still eludes understanding. Rock engraving and rock painting regions usually occur in discreet and

separate areas elsewhere in South Africa. In the LSCA, engravings are found on vertical rock walls within shelters where paintings also occur. Indeed, the cupules and cut marks, engravings of animals and animal spoor, and their relation to the unique and intriguing fine-line paintings pose a formidable challenge to researchers.

2. The high percentage of depictions of women in the LSCA rock art points to their significance in the cosmology of the San of the region. A full understanding of women's roles in San rock art is still elusive. It is possible that the art of the LSCA may shed new light on this important aspect of our understandimg of the past.

3. The large number of Y-shapes, once identified formally as aprons in the literature, may lead to further research opportunities on an aspect of rock art that has hitherto been overlooked.

These are some of the possibilities raised by the material obtained from recent surveys of the LSCA rock art. There are, obviously, far more possibilities. Whether or not the social significance and the meaning of the art in this area is ever solved, it is certain that the region holds as much potential for understanding hunter-gatherer cosmology as do the better-known areas of rock art to the north in the Matopos and to the south in the southeastern mountains and Cederberg.

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CLIMATIC CHANGE ACROSS THE PLEISTOCENE/ HOLOCENE BOUNDARY IN THE CALEDON RIVER SOUTHERN AFRICA: RESULTS OF A FACTOR ANALYSIS OF CHARCOAL ASSEMBLAGES*

A.B. ESTERHUYSEN

Department of Archaeology, University of the Witwatersrand, P.O. Wits, 2050, South Africa

P.J. MITCHELL

Pitt-Rivers-Museum, Oxford, England

and

J.F. THACKERAY

Transvaal Museum, P.O. Box 413, Pretoria, South Africa

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ABSTRACT

This paper presents the results of a multivariate analysis of late Pleistocene and early Holocene charcoal assemblages from Rose Cottage Cave in South Africa, and Tloutle in Lesotho. The results of a factor analysis suggest that cool conditions prevailed between 12 000 and 10 000 BP, and at c. 7000 BP. Mesic conditions in the early Holocene were followed by a drier period dated between 8500 and 7200 BP, but that wetter conditions resumed circa 6500 BP. These data are discussed in the light of palaeoenvironmental evidence from Africa south of the Limpopo.

INTRODUCTION

Recent excavations at archaeological sites in the Caledon Valley have yielded evidence relevant to a wide range of palaeoenvironmental studies (Wadley 1991; Mitchell 1994). Analysis of charcoal assemblages comprises one such study, and results from sites in both the Free State (Wadley *et al.* 1992; Esterhuysen 1996) and the Phuthiatsana Basin of western Lesotho have already been reported (Esterhuysen & Mitchell 1996). Here we use factor analysis as a means of investigating these data further. This kind of multivariate analysis has been previously applied to both micro mammalian and pollen assemblages from a number of southern African sites (Scott & Thackeray 1987; Thackeray 1987, 1988, 1994; Thackeray & Avery 1990).

THE SITES

Rose Cottage Cave

Rose Cottage Cave (RCC) (29.13S; 27.28E) lies in the eastern Free State near Ladybrand at ± 1660 m asl (Fig. 1). It preserves a long sequence of Upper Pleistocene and Holocene occupation deposits, most recently excavated by Wadley (1991, 1997). For the period 13-5000 BP nine layers have been recognised and three distinct artefact traditions identified. Level Pt yielded a Classic Wilton assemblage and overlies assemblages from layers JaG, Ph, Cm, H and O that belong to the Oakhurst Industrial Complex. Beneath these layers DCM, LB and DB present a Robberg-like industry with occupation dated to both the earliest Holocene and the late Pleistocene. Details of relevant radiocarbon dates are given in Table 1.

Both an initial study of charcoals from Rose Cottage Cave (Wadley *et al.* 1992) and a more thorough second investigation (Esterhuysen 1996) indicated that the vegetation in the site's vicinity had responded to the climatic changes marking the Pleistocene-Holocene boundary. Charcoal was analysed from all layers except O, DCM and the unit in Pt dating to c. 7600 BP. A total of 1491 pieces was examined (Esterhuysen 1996). The

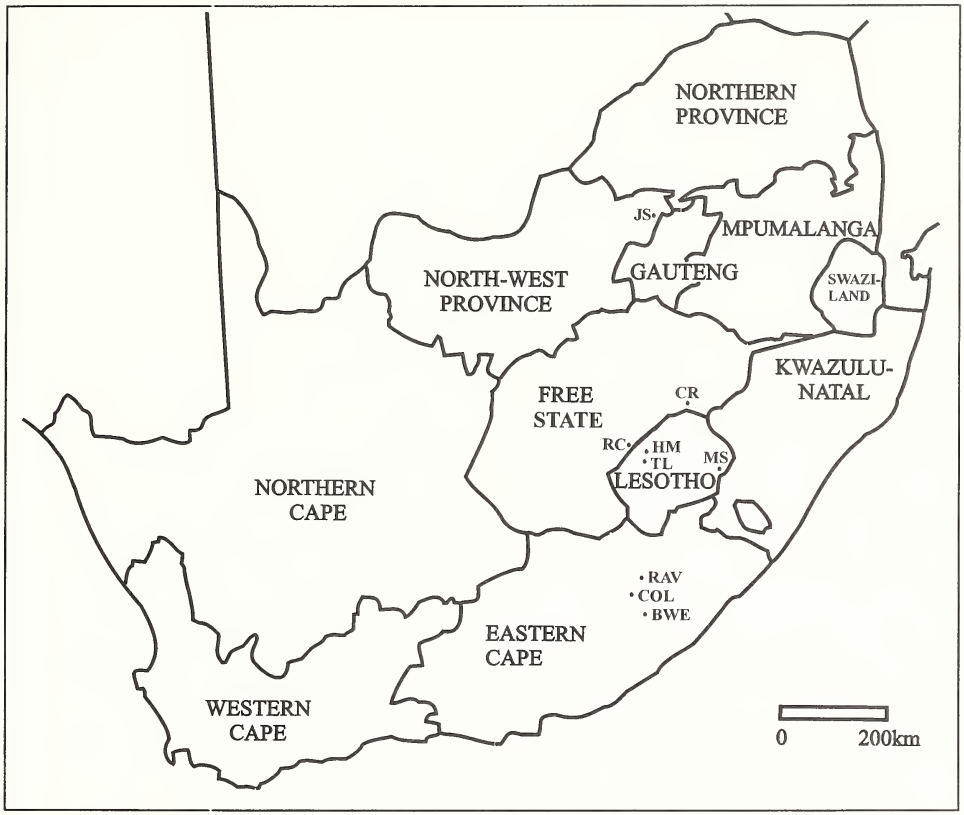

Fig. 1. Africa south of the Limpopo, showing the locations of Rose Cottage Cave, Tloutle and other sites mentioned in the text. Abbreviations: BWE Bonawe; COL Colwinton; CR Craigrossie; HM Ha Makotoko; JS Jubilee Shelter; MS Mashai River; RAV Ravenscraig; RC Rose Cottage Cave; RV Rietvlei; TL Tloutle.

second analysis confirmed a marked change in the kinds of vegetation represented in Late Pleistocene and early Holocene deposits. *Cliffortia* spp., *Protea* spp., *Leucosidea sericea* and *Rhus* spp. predominated in terminal Pleistocene samples, while *Rhus, Olea* and *Buddleia* dominated the early Holocene assemblages. The second analysis also suggested changes in vegetation during the first half of the Holocene, possibly associated with climatic change that affected the availability of plants suitable for wood collected by human agents of accumulation. In order to investigate this further, charcoal from the Lesotho site, Tloutle (Fig. 1), was analysed for comparison with the Rose Cottage Cave charcoal assemblages.

Tloutle

Tloutle rock-shelter (29.28S; 27.46E) is situated at an altitude of 1879m asl in the Phuthiatsana Basin of western Lesotho. The main sequence of deposits here is of early and middle Holocene age, although sporadic Later Stone Age occupation in the second millennium AD is also attested (Mitchell 1993a). Preceding this three distinct artefact assemblages were identified: a Robberg-like assemblage of probable terminal Pleistocene age at the base (layers BC and BS); an industry in layer GS reminiscent of Goodwin and Van Riet Lowe's (1929) original definition of the Smithfield B and now recognised as an evolved component of the Oakhurst Industrial Complex; and lithic assemblages representing the early and classic phases of Sampson's (1974) Interior Wilton Industry in layers CSL-LR, CSL-UP and CCL. Assemblages from layers WC, BGL and SS, which lie just below the surface of the deposit, are palimpsests of Classic Wilton and much more recent material (Mitchell 1993a).

Charcoal was present throughout the sequence, but in layers WC, BGL and SS consisted of tiny flecks that could not be retrieved for analysis. In general, all the

Table 1. Rose Cottage Cave: radiocarbon dates from recent excavations of the Pleistocene and early Holocene levels (after Wadley 1991; Wadley 1995).

Layer	Lab. No.	Date BP
Pt	Pta-5934	5970 ± 70
Pt	Pta-6783	7630 ± 80
JaG	Pta-5600	8380 ± 70
H	Pta-5560	8610 ± 40
O	Pta-5599	9250 ± 70
DB	Pta-5593	12690 ± 120

Table 2. Tloutle: radiocarbon dates from the Pleistocene and early Holocene levels.

Layer	Lab. No.	Date BP
BGL	OxA-4070	375 ± 65
BGL	OxA-4068	5080 ± 80
CCL	Pta-5158	6140 ± 100
CSL-UP	Pta-5162	6910 ± 80
CSL-LR	Pta-5171	7230 ± 80
GS	Pta-5172	8680 ± 70

charcoal pieces from this site were small and fragmentary. For this reason all pieces (totalling 2271) that could be sectioned were analysed. The taxa identified indicated that the Tloutle inhabitants were harvesting similar woods to their RCC counterparts (Esterhuysen 1996).

FACTOR ANALYSIS

Factor analysis can be used to detect underlying structures in large matrices of data (Gould 1992:238). In this study the technique was employed in an exploratory study to identify possible factors that contributed to variability in the relative abundance of taxa represented by charcoal in the Rose Cottage and Tloutle assemblages. As in principal component analyses, interpretation of the dichotomies between taxa with high or low loadings on the principal factors (*cf.* components) relies on a knowledge of the modern distribution and abundance of those taxa (Scott & Thackeray, 1987).

Taxa not well represented by charcoal at Rose Cottage Cave and Tloutle were excluded in order to minimise statistical noise. The remaining taxa were re-expressed as percentages of their own sum. These percentages were then incorporated into a factor analysis. Summary statistics were calculated by summing the products of the loadings (Table 3) on the first factor (F1) and the percentage occurrences of the corresponding taxa. These indices (factor scores based on F1) were designated FS1, and were then standardized for each assemblage between 0 and 100 (i.e., SSF1, summary statistics based on F1). Similarly SSF2 values were calculated by summing the products of F2 loadings and the respective percentages for the corresponding. Figs. 2 and 3 show these indices plotted for each of the late Pleistocene and early Holocene layers at Rose Cottage Cave and Tloutle.

RESULTS

Rhamnus, Protea, Leucosidea and *Pittosporum* display loadings on the first principal factor (F1), while taxa with high loadings on F1 include *Rhus, Olea, Celtis, Buddleia* and *Diospyros. Rhamnus, Protea* and *Leucosidea* flourish at cool, high-altitude conditions (Bews 1925; Palmer & Pitman 1972; Palgrave 1983), while *Rhus, Olea, Celtis, Diospyros* and *Buddleia* often form the main components of 'warmer' montane woodlands (Palmer & Pitman 1972; Henderson 1987). We infer that the dichotomy between taxa with high and low loadings on F1 relates primarily to temperature.

Taxa with the most negative loadings on the second principal factor (F2) are *Protea, Rhamnus* and *Euphorbia. Leucosidea, Olea* and *Erica*, on the other hand, display the most positive loadings on F2. An environmental factor which appears to be primarily responsible for this dichotomy appears to be related to moisture. Protea spp. possess xerophytic characteristics (Bews 1925:158-160) and a typical summer-rainfall species such as *Protea caffra* is found most frequently on dry slopes and rocky ridges where drainage is exceptionally good (De Winter et al. 1966:35). *Rhamnus* has a wide modern distribution, but displays a high tolerance for dry conditions (Pooley 1993:300), while *Euphorbia* is generally adapted to dry conditions (Bews 1925:42). *Leucosidea*, on the other hand, prefers moister conditions; although it has been known to occupy dry areas, this is usually at high altitudes where conditions are cooler and evapotranspiration low (Scholes pers. comm.).

In this analysis *Olea* and *Erica* have the highest F2 loadings grouped together with other taxa associated with moist conditions. In a separate factor analysis, Ericaceae pollen from the eastern Free State sites of Craigrossie, Elim and Cornelia, were associated with taxa that also related to moist conditions (Scott 1989).

DISCUSSION

The data from the two sites compare well. The SSF1 'temperature' indices suggest low temperatures around 12 690 BP. Higher temperatures prevailed around 11 000 BP. Thereafter there appears to be a dramatic increase in temperature as reflected by assemblages GS (Tloutle), Ha, Cm, Ph and Ja (Rose Cottage Cave) all dated between about 9000 and 8000 BP. Sometime around 7200 BP (CSL-LR, Tloutle) conditions became cooler.

The SSF2 'moisture' index indicates that conditions around 12 690 BP were moist. This could be attributable to more effective atmospheric moisture due to cooler conditions, and/or an increase in rainfall. Layer LB reflects drier conditions possibly associated with global warming during the Pleistocene/Holocene transition. Early Holocene mesic conditions dating c. 8600 BP seem to have been followed by a drier episode between about 8500 and 7200 BP. Between 6900 and 5500 years ago conditions once again became wetter.

Table 3. Rose Cottage Cave and Tloutle: loadings of charcoal taxa on the first and second principal components of the factor analysis.

F1		F2	
Celtis africana	0,78	*Erica* spp.	0,87
Rhus spp.	0,61	*Olea africana*	0,58
Olea africana	0,57	*Leucosidea sericea*	0,54
Buddleia spp.	0,45	*Podocarpus* sp.	0,47
Diospyros spp.	0,35	*Pittosporum viridiflorum*	0,39
Euryops spp.	0,25	*Celtis africana*	0,27
Euphorbia sp.	-0,12	*Euryops* spp.	0,22
Podocarpus sp.	-0,13	*Diospyros* spp.	0,07
Erica spp.	-0,27	*Buddleia* spp.	-0,04
Rhamnus sp.	-0,31	*Rhus* spp.	-0,15
Protea spp.	-0,55	*Euphorbia* sp.	-0,31
Leucosidea sericea	-0,65	*Rhamnus prinoides*	-0,32
Pittosporum viridiflorum	-0,73	*Protea* spp.	-0,52

Comparison with the results of faunal and sediment analyses

Faunal evidence from mid-Holocene levels at Rose Cottage Cave are consistent with interpretations based on the charcoal data. Sable antelope (*Hippotragus* cf. *equinus*) occur in the Pt layer and kudu (*Tragelaphus strepsiceros*) and vervet monkey (*Cercopithecus aethiops*) in the Oakhurst levels, which "suggests that the valley of the Caledon River, or perhaps the area in general, could have been more wooded in the past than it is at present" (Plug & Engela 1992:19). Further evidence for a mesic close-canopy vegetation at this time may be given by the overwhelming presence of vleirats (*Otomys irroratus*) in the associated micro mammalian assemblages (Avery 1982). Analysis of the representation of the ungulate taxa at Rose Cottage Cave according to their preference for wet or dry environments also indicates that conditions were wettest at the end of the Pleistocene and again in level Pt (Engela 1995).

Butzer's (1984) sediment analysis of the stratigraphic sequence at Rose Cottage Cave is compatible with these observations based on fauna and charcoal. His identification of two 'wetter' periods, the first associated with a date of 8600 ± 100 BP (Pta-2067) and the second with one of 6850 ± 45 BP (GrN-5299) fits the results of the factor analysis, without necessarily implying that rainfall remained high throughout the intervening period.

Isotopic analysis of faunal remains from RCC and Tloutle likewise indicated a warmer phase c. 8400-8100 BP followed by a cooler phase c.7200 BP, and a return to warmer conditions between 6900 and 5900 BP (Smith 1997:129).

At Tloutle three additional lines of evidence support the results described above. First, the occurrence of sinter deposited from springs in the GS layer (which is associated with a date of 8680 ± 70 BP, Pta-5172) implies that conditions were relatively humid at this time. This is supported, both in GS and for the period 6900 - 5000 BP, by the presence of *Otomys irroratus*, a rodent species usually indicative of a high percentage of canopy cover accompanied by a moist streamside element (Plug 1993). Thirdly, the presence of ostrich (*Struthio camelus*) in the fauna from the 7230 - 6100 BP layers (Plug 1993) is consistent with this having been a relatively warm period as ostrich are not found in western Lesotho today.

Regional Evidence

Pollen studied from Craigrossie (Fig.1), eastern Free State, shows the development of *Podocarpus* forest and moist conditions prior to 10 700 BP (Scott 1989:107; Scott 1990). Similar moist, cool conditions at 10 200 ± 100 BP are suggested by a high percentage of *Leucosidea sericea* in charcoal assemblages at Ravenscraig (Fig.1), northern Eastern Cape (Tusenius 1989). Based on EDXA measurements of *Olea* and *Rhus* charcoals from Bonawe (Fig. 1) in the same area dry conditions are thought to have occurred at 8040 ± 100 BP (Pta-1709; Tusenius 1989). A period of cooling c. 9000 - 8300 BP is also evident from the relative increase in *Leucosidea* in charcoal assemblages at Ha Makotoko, western Lesotho (Fig. 1) (Mitchell 1993b; Esterhuysen & Mitchell 1996). Carter's (1976) dating of peat layers interbedded with fluviatile material in the Upper Mashai River catchment of the eastern Lesotho highlands shows an increase in precipitation from 7280 ± 150 BP (Q-1165).

Studies carried out at sites on the margins of the interior plateau, in the Northern Province bushveld zone and along the coast exhibit similar trends (Partridge *et al.* 1990; Partridge 1993). In general the palaeoclimatic proxy evidence for several southern African localities south of the Limpopo suggests that conditions at the end of the Pleistocene c. 12000 BP were cool and moist, that a dry phase occurred c.8000 BP and that there was a resurgence of wet conditions after 7000 BP (Partridge *et al.* 1990; Partridge 1993). Two localised incidences of contradictory evidence need to be noted. Charcoals from Colwinton, northern Eastern Cape Province (Fig. 1), indicate dry conditions c. 6270 BP (Tusenius 1989) and micro mammalian data from Jubilee Shelter, North West Province (Fig. 1), suggest that tree cover there also

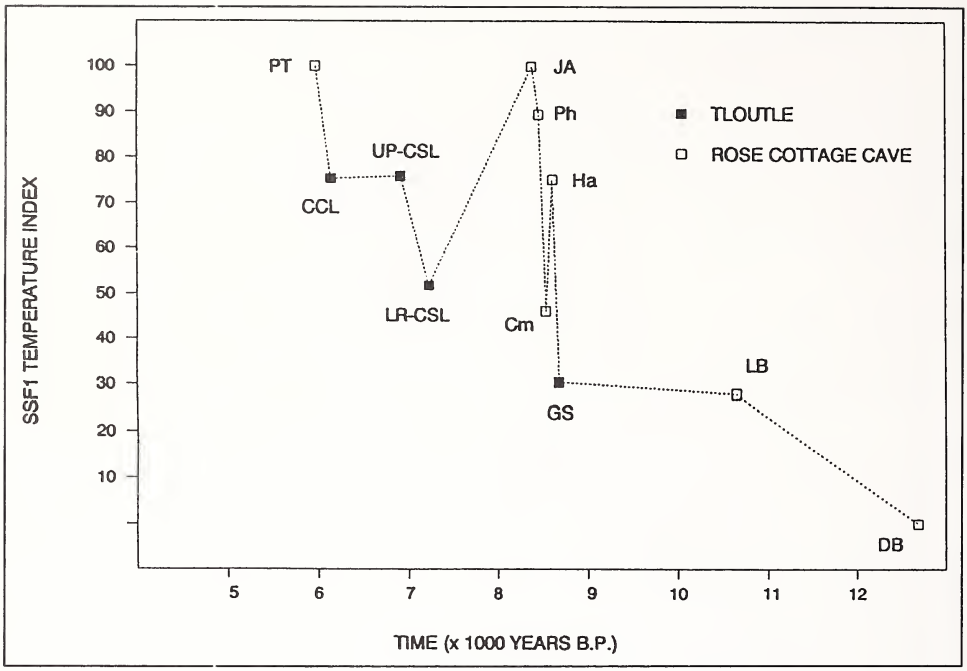

Fig. 2. Rose Cottage Cave and Tloutle: plot of values of SSF1 'temperature' index obtained from factor analysis of charcoal data from the late Pleistocene and early Holocene layers.

declined at this time (Avery 1993). Though higher resolution models need to be developed which can take account of such local anomalies (Partridge 1990), in general the evidence supports the case for a wet Altithermal across Africa south of the Limpopo (Partridge 1993).

The high degree of consensus between results of the charcoal analysis and other palaeoclimatic evidence suggests that the patterning detected by factor analysis in the Rose Cottage Cave and Tloutle charcoal data is related primarily to temperature and moisture fluctuation. It would appear that palaeoenvironmental factors have played a major role in contributing to variability in the relative abundance of charcoal fragments representing taxa selected by human occupants of the Rose Cottage and Tloutle cave sites.

CONCLUSION

Charcoals were analysed from two different sites in the Caledon River Valley. The application of factor analysis reported here has facilitated a comparison of the results of the charcoal analysis from the eastern Free State site, RCC and the penecontemporaneous western Lesotho site of Tloutle. It has allowed a more refined index of palaeoenvironmental change to be produced (Figs 2 and 3). The results of the factor analysis confirm cool temperature regimes between 12 000 and 10 000 BP. An increase in temperature occurred within the period between 9000 and 8000 BP, followed by a cool phase c. 7 200 BP. The factor analysis on charcoal data also provides an indication of relative changes in moisture through time: mesic conditions were followed by a drier period between 8500 and 7200 BP, while moister conditions prevailed circa 6500 BP. This pattern of moisture fluctuation is evident at other sites in South Africa and Lesotho. The fact that 'wet' spells occurred in both the northern and southern regions of Africa south of the Limpopo suggests that higher resolution models (*sensu* Partridge 1993:242) are required to explain these phenomena.

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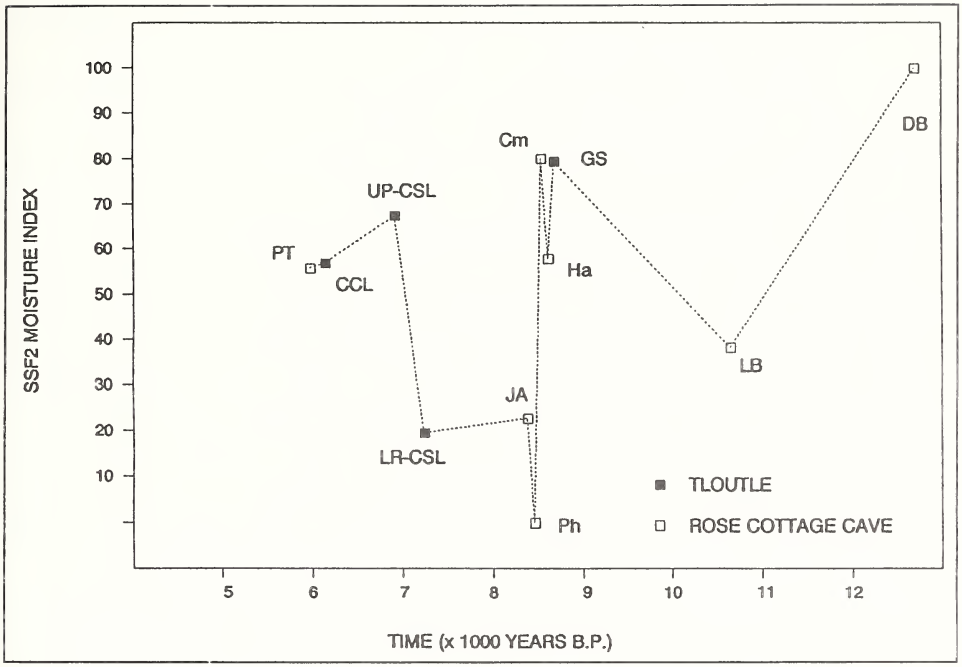

Fig. 3. Rose Cottage Cave and Tloutle: plot of values of SSF2 'moisture' index obtained from factor analysis of charcoal data from the late Pleistocene and early Holocene layers.

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THE 1998 FIELDWORK ON THE STONE AGE ARCHAEOLOGY AND PALAEOECOLOGY OF THE GEELBEK DUNES, WEST COAST NATIONAL PARK, SOUTH AFRICA*

NICHOLAS J. CONARD, TIMOTHY J. PRINDIVILLE & ANDREW W. KANDEL

Institut für Ur- und Frühgeschichte, und Archäologie des Mittelalters, Universität Tübingen, Schloss Hohentübingen, Burgsteige 11, D-72070, Germany

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ABSTRACT

In February and March of 1998 archaeological investigations were conducted in the Geelbek Dunes of the West Coast National Park. Preliminary results indicate the presence of Late and probably Middle Stone Age artifacts spatially associated with faunal remains. The majority of finds were located on exposed surfaces within the numerous deflation bays of the dune system. Distinct geological strata including unconsolidated sand overlying semi-consolidated sand and a series of calcrete formations provide a rough relative chronology for the dune system. The team used global positioning technology to produce a map of the dunes including the location of 101 deflation bays. In five deflation bays, surface finds were thoroughly collected and measured in three dimensions using a total station. This method proved to be effective in documenting these diffuse accumulations and for producing topographic maps of the local terrain. Excavations were also conducted to locate buried finds and to study site formation processes. More than 2,200 faunal remains and 800 lithic artifacts were documented. Results from the 1998 field season demonstrate the presence of diverse faunal and lithic accumulations, which should ultimately allow the study of patterns of hominid subsistence, land use and social behavior within the dynamic environmental setting of the Later Quaternary of the Western Cape.

INTRODUCTION

In southern Africa, as is the case in many parts of the Old World, researchers in Paleolithic archaeology have traditionally focused resources on rich cave sites and, to a lesser extent, on rich open-air accumulations. The current fieldwork in the Geelbek dunes deliberately directs its attention to open-air settings, where large horizontal exposures of many hectares allow the study of the distribution of lithic artifacts and faunal remains across the landscape in largely unconstrained space. The deflation bays at Geelbek preserve the remains of numerous ephemeral occupations and activities that have thus far escaped systematic study. We contend that the sites of low and middle density presented here can augment information available from more traditional studies of caves sites and rich open-air accumulations and provide important evidence for the reconstruction of behavioral patterns of Stone Age peoples. The preliminary results presented here, while leaving many questions unanswered, point to an avenue of inquiry that may ultimately provide useful information on past patterns of subsistence, land use and social behavior during the Stone Age.

The Geelbek dune field is located in the West Coast National Park, 5 km east of the Atlantic Coast, at the southern most point of Langebaan Lagoon (Fig. 1). The ca 4 km^2 mobile dune system preserves numerous deflation 'hollows' or 'bays' containing surfaces upon which stone artifacts and fossilized animal bones have been exposed (Fig. 2).

The University of Tübingen's current project in the Geelbek Dunes focuses on documenting a wide variety of Stone Age occurrences of both archaeological and non-archaeological origins. Special attention is paid to spatial relationships among finds and features, and low density, ephemeral accumulations are considered as informative and equally interesting as rich deposits in the reconstruction of Stone Age subsistence and paleoecology. The material preserved in scores of the deflation bays should provide useful information about the distribution of activities in areas that have traditionally been seen as 'off

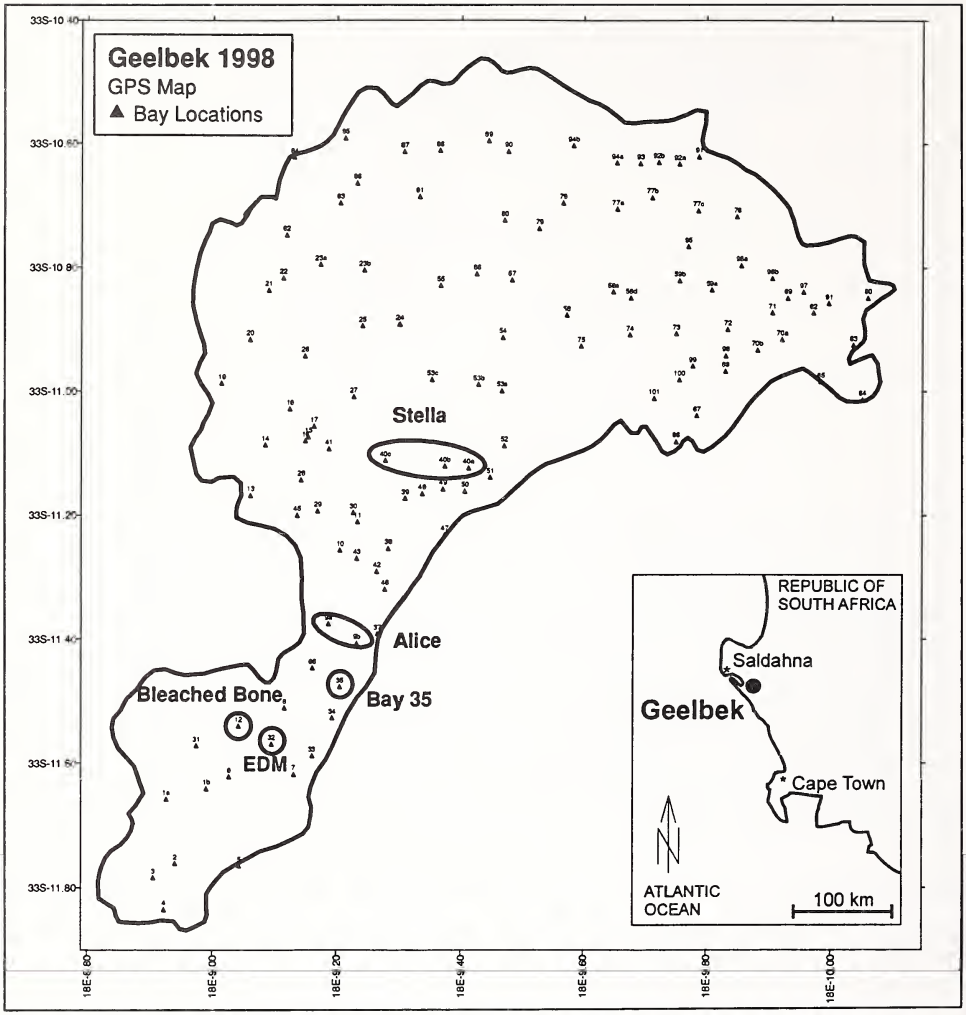

Fig. 1. Map of the Geelbek Dunes with the location of the 101 deflation bays and the five bays at which systematic surface collection and excavation have been conducted.

site' (*cf.* Foley 1981; Isaac 1981). Ethnographic and archaeological evidence suggest that the spatial patterning of hunter-gatherer camps is often only detectable when significantly large areas are investigated (O'Connell 1987, 1995; Ebert 1992:190-194). The interdunal exposures of the Geelbek Dunes provide large surfaces of Pleistocene and Holocene Age which allow for the recognition of such patterns. As is the case with sites in similar settings, such as Elandsfontein (Inskeep & Hendey 1966; Klein 1978; Avery 1989) and Duinefontein (Deacon 1976; Klein 1976), we anticipate that the systematic study of the density and distribution of different archaeological signatures over these large surfaces will provide new insights into the dynamics of Stone Age settlement, subsistence, social behavior and ecology within the contexts of the changing Pleistocene and Holocene environments.

GEOLOGICAL SETTING

Although the appearance of the exposed surfaces within the Geelbek dune system varies from bay to bay, a rough

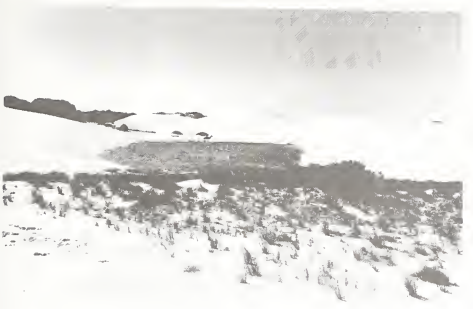

Fig. 2. An example of a deflation bay within the dune system during survey.

stratigraphy can be observed. Calcareous yellow and white mobile sands of the Holocene Witzand formation overlie an undulating, semi-consolidated sandy surface upon which root casts in various stages of weathering can be found. These sands in turn overlie one or more calcrete layers of the Pleistocene Langebaan Limestone Formation which can vary greatly in hardness and composition. Summer winds from the south-southeast generally dominate the north-northwesterly winds of the winter months, producing a net movement of sand towards the north (Lancaster 1987, Manhire 1987). Wind erosion can expose several different surfaces in a single bay. The archaeological finds appear to originate out of the semi-consolidated sands and several of the calcrete layers. While reliable dates are not yet available for the sand dunes and the calcrete formations at Geelbek, several preliminary observations and research in surrounding areas provide indications about the age of the strata and of the archaeological finds contained therein. The rarity of prehistoric ceramics in the dunes suggests that the more recent phases of the LSA are poorly represented. A single U/Th date measured in Pretoria from a sample of the hard calcrete from one of the deflation bays (Stella) yielded an age of ca 40 ka. The date of this sample probably reflects the final stages of calcium carbonate migration and must be considered a minimum age (Woodborne pers. comm. 1998). The finds from this deposit thus predate 40 ka. Traditionally, the sand and calcrete exposed by the dunes have been considered to be roughly dated to the last glacial cycle (Theron *et al.* 1992:50). Results of the IRSL dating of the aeolianites along nearby Langebaan Lagoon in which hominid footprints were preserved indicate an interglacial date of ca 117 ka (Roberts and Berger 1997) and suggest that the traditional interpretation may be correct. However, caution must be taken when interpreting the complex pedological processes involved in the formation of duricrusts (see discussion in Mabutt 1956, Butzer 1973, Deacon and Lancaster 1988:34-5) as well as the chronology of dune development (Compton, pers. comm. 1999). At present the chronology of the Geelbek Dunes is poorly understood and further dating of the archaeological and geological deposits is needed.

At a minimum, several phases of Stone Age occupation are preserved in the Geelbek dunes. Given that visually similar calcrete horizons and layers with rhizoliths in different bays need not be of the same age, these strata may well preserve finds of a wide range of ages. The dating of the lithic and faunal assemblages, however, may be complicated by multiple phases of sedimentation, deflation and calcrete formation. Gaining a better understanding of the chronological and geological complexity of the dune system is currently a central focus of the research project.

THE 1998 FIELD SEASON

During the five weeks of fieldwork in February and March, 1998, the crew of six had four main objectives: 1) to map the dune system and its deflation bays; 2) to describe the geological setting and contexts of the bays; 3) to document in detail the distribution of archaeological and palaeontological finds within several of the bays; and 4) to isolate and document buried finds, while examining site formation processes through test excavations.

A system was defined to describe the hierarchical relationships of the archaeological occurrences within the dune system. The individual bays were defined as 'localities', each of which contained its own set of running find numbers. Each locality could contain a number of areas defined as 'sites' which in turn could contain 'scatters' of finds that, at the time of recording, appeared to be associated. Thus, a find would typically bear a designation indicating its locality, site, scatter and find number. The three-dimensional position of all finds and the local topography of the bay were measured with a Leica/WILD Total Station in conjunction with the Hunter 16 (Husky Corp.) field computer onto which the EDM program (Dibble & McPherron 1996) was installed. This system allowed objects and their associated contextual information to be recorded quickly and accurately. The resulting data were subsequently downloaded onto a PC. Distribution plans could then be updated daily with the Surfer program (Golden Software). With this computer-assisted system, as many as 460 finds were piece-plotted in one day. Several finds which could not be removed from the calcrete were recorded, but left in the field.

In all, 101 bays were surveyed, and the distribution of finds was rigorously documented in five bays (Fig. 3). These bays were designated: Bay 35, EDM, Bleached Bone, Alice and Stella. After a systematic surface collection, areas were chosen for excavation. These excavations generally consisted of a group of contiguous square meters in areas where a higher density of surface finds had been recovered (Fig. 4). All lithic artifacts and faunal remains found while excavating were recorded with the Total Station as described above. In each square meter, sediment from ca 2 cm thick spits was collected and dry-screened though 5 mm and 2.5 mm mesh. Excavators collected all lithic artifacts and larger faunal

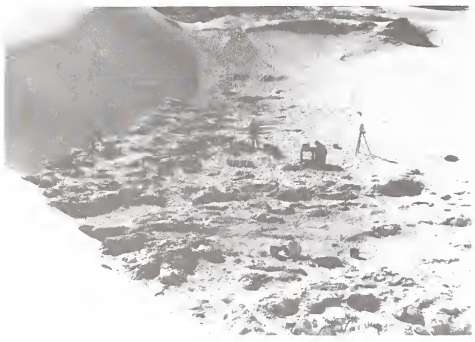

Fig. 3. Overview of EDM showing excavation of semi-consolidated sands on and between calcrete banks.

Fig. 4. Excavation of five square meters in Stella, Site A.

remains, as well as a sample of the microfauna and molluscan fauna contained in each unit of sediment. Although the majority of finds were recovered in the first spit, at least one spit was excavated further to determine if finds were present in the sub-surface deposits. In areas with many finds, such as the lithic concentration in Stella, Site B, Scatter 1, excavation proceeded in quarter meter units for enhanced spatial resolution.

A map of the dunes was created using data from a Garmin 12XL GPS instrument. The outline of the dunes and the position of local roads and buildings as measured with the GPS device are in agreement with published aerial photographs and topographic maps. For the 101 bays included in the 1998 survey, the geographic position was recorded, the dimensions approximated, the locality photographed, the geological situation described, and the relative abundance of faunal and lithic material recorded. At least ten other bays were sighted, but were not examined. The precise positions of the five bays studied in detail were documented within a single, locally defined grid. The positions of these and the other surveyed bays can be seen in Figure 1. Detailed maps of the find distributions within the bays can be seen in Figures 5-9.

RESULTS

The geological settings of the bays range from positions with numerous *in situ* root casts, like Bleached Bone, to bays including EDM, Alice and Stella, where larger areas of calcrete are exposed. With the exception of Bleached Bone, where no calcrete was visible, all localities include surfaces of wind-exposed calcrete and less eroded areas in which undisturbed rhizoliths were preserved. Thus the finds from Bleached Bone appear to be the youngest in the sequence. Some bays, particularly Stella, preserved several different, visibly discernable types of calcrete and presumably document multiple phases of pedogenesis. Discussions in the field with John Compton (University of Cape Town), John Parkington (University of Cape Town), Dave Roberts (Council for Geoscience) and Stephan Woodborne (CSIR, Pretoria) helped to clarify some of the complexity related to the formation and dating of the calcretes and rhizoliths. Clearly, these features need to be studied in more detail at Geelbek and in other areas. On March 11, 1998 Stephan Woodborne collected six samples from Stella for dating using C^{14}, TL and U/Th. Results from these samples should be useful in establishing a chronology for the dunes and the archaeological and palaeontological sites they contain.

Preliminary conclusions can be drawn from the five bays which were investigated in detail. Bays of differing size and geological setting were purposely chosen, and clear differences between the bays and their contents can be seen. While all bays have yielded lithic artifacts and faunal material, the relative abundance, density and distribution of archaeological materials are highly variable. This spatial information can be used to study taphonomic processes and the function within the sites as was the case in the similarly situated site of Elandsfontein (Avery 1989). Bleached Bone, for example, produced numerous faunal remains, including seven clear faunal scatters (Fig. 7, Table 1). The same bay, however, yielded few lithic artifacts from only two of these scatters. This bay could be interpreted as a place where faunal material accumulated largely in the absence of human activities. Most of these bones, predominantly the remains of small artiodactyls, have been bleached white

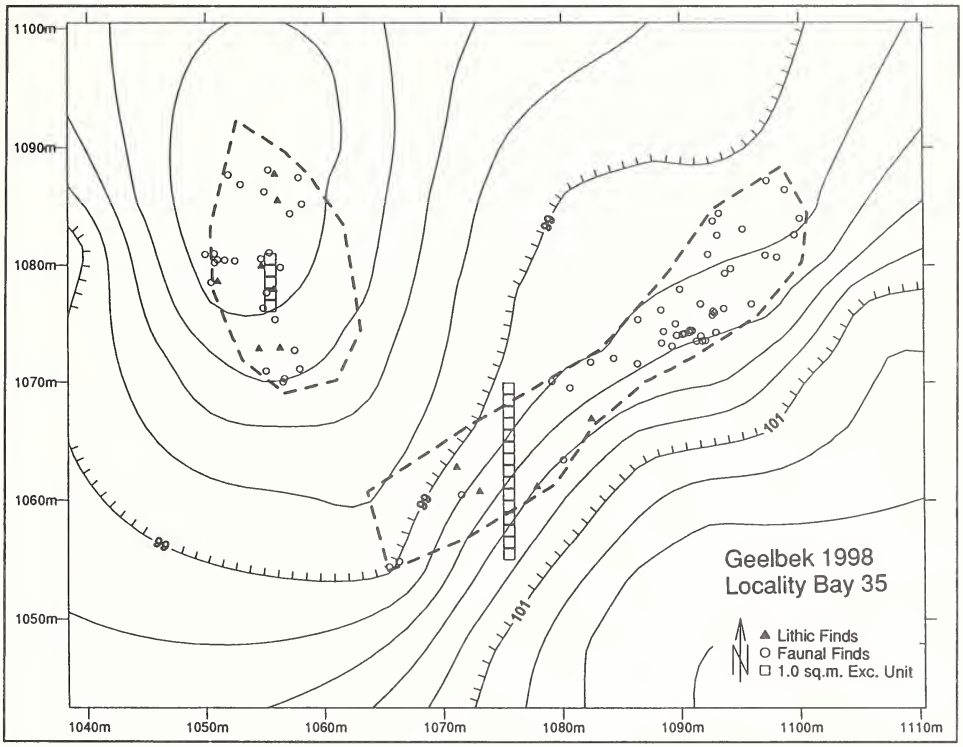

Fig. 5. Topographic position of the Bay 35 Locality and the distribution of lithic finds, faunal materials and excavation areas.

and are not heavily mineralized.

Bay 35, EDM and Alice represent bays where a diverse array of faunal remains preside within a low-density distribution of artifacts (Figs. 5, 6 & 8, Table 1). At Alice, a relative abundance of hammerstones and probable grinding stones has been documented. Interestingly, Sites A and C at Alice yielded numerous lithic artifacts, while no lithic artifacts were found at Alice, Site B. As at Bleached Bone, the distributions of faunal and lithic artifacts in these localities are far from uniform. Although burned bone and lithics were recovered in many of the localities, none of these seem to indicate the presence of features in which the controlled use of fire can be demonstrated. However, the preservation of such features in a sandy substrate is unlikely and frequent natural fires in the sandveld can be expected (Manhire 1987).

On the whole, faunal remains were more numerous than lithic artifacts, and many different animal species are represented among the more than 2200 recorded faunal remains. Specimens from various avian, mammalian (bovids, equids, carnivores and rhinoceros), reptilian and molluscan species were recovered. All faunal remains were categorized by taxa, and the mammalian bones were further divided into size-classes (Table 1) which closely parallel those defined by Brain (1981) and Klein and Cruz-Uribe (1991). When possible, skeletal element and species were also recorded in the field. At the time of recovery, the team found it difficult to distinguish 'small-medium' and 'large-medium' bovids. As a result, these size classes are counted together in this report. Further analyses of the faunal material should provide palaeo-environmental data for the Cape Fynbos Biome (Moll 1987) and will contribute to the reconstruction of later Quaternary ecosystems and Stone Age subsistence practices at Geelbek.

Stella is the largest of the bays studied and provided the largest and richest faunal and lithic assemblages (Fig. 9, Table 1). Particularly noteworthy is the concentration of artifacts of beige silcrete with red banding at Site B, Scatter 1. Artifacts of this material are dispersed over at least 100 m^2, and the find densities vary, reaching more than 10 artifacts/m^2 when excavated and surface finds are counted together. As is the case at other bays such as Alice or Bleached Bone, Stella yielded several, clearly recognizable scatters of faunal material, including many bones of rhinoceros at Site A, Scatter 1 (Fig. 10). Such concentrations of bone from single animals are especially

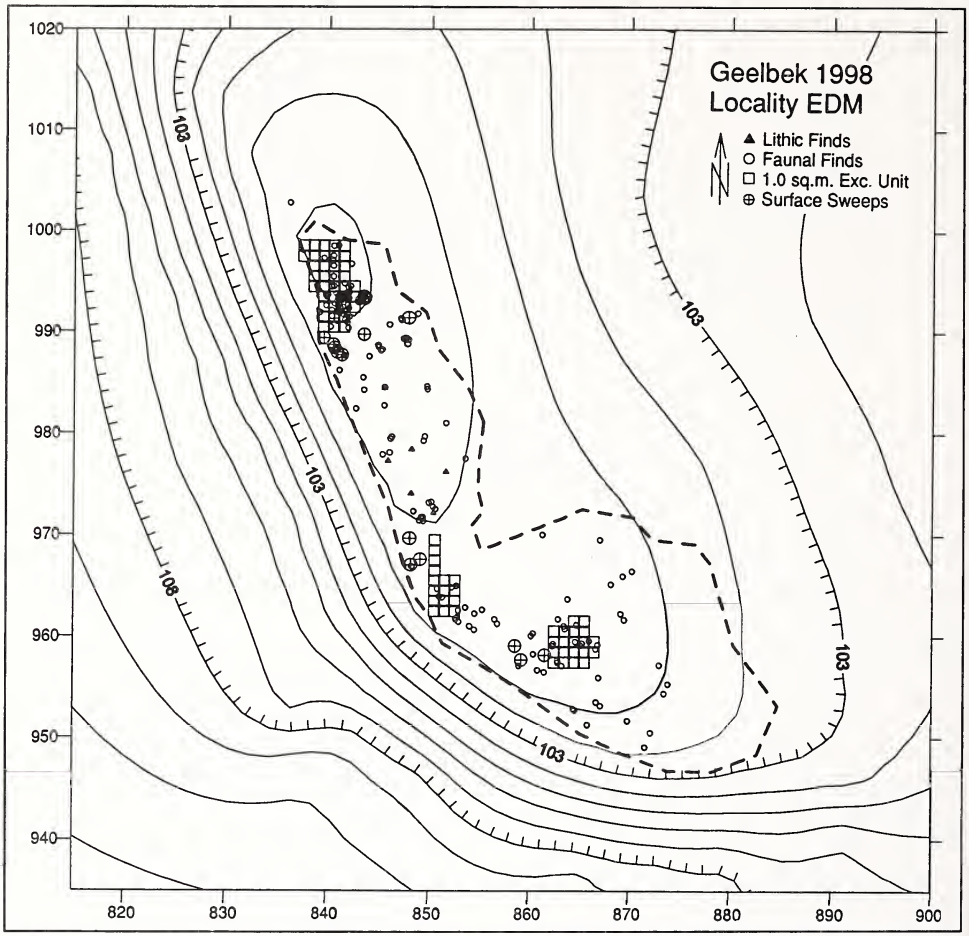

Fig. 6. Topographic position of the EDM Locality and the distribution of lithic finds, faunal materials and excavation areas.

important in addressing the potential utilization of animal resources by hominids. Here and elsewhere, faunal remains and lithic artifacts occur in the same area, however, the association between these two groups has yet to be demonstrated. Presumably, cases do occur where the deposition of faunal and lithic material result from the same period of human occupation, and further work is needed to address this question in more detail. Information on human subsistence, animal ecology and taphonomic processes at Geelbek will be gained by the systematic study of both modifications on bone and the refitting of animal remains (Conard, Adler & Prindiville 1998). Both anthropogenic (*i.e.*: cutmarks and impact fractures) and non-anthropogenic modifications (*i.e.*: traces of chewing and gnawing) will be considered. The results of these analyses will document past activities on a short time-scale because animal resources have a limited period of economic utility.

The more than 800 recorded stone artifacts from Geelbek show characteristics of both the MSA and LSA, and the presence of both would not be surprising in this geological setting. No handaxes or other indicators of ESA occupation have been documented. Seen as a whole, the lithic assemblage at Geelbek is unusually rich in cores (Table 1). Most of these are small, single or multiple platform cores. Well-made blade and bladelet cores are present, as are a range of informally and centripetally reduced cores. Notched and denticulate forms are the most abundant tools (Fig. 11.2); other forms of scrapers are rare. Several small backed pieces were recovered in Stella, Alice (Fig. 11.3) and Bleached Bone including the base of a backed point in Bleached Bone (Fig. 11.4). One

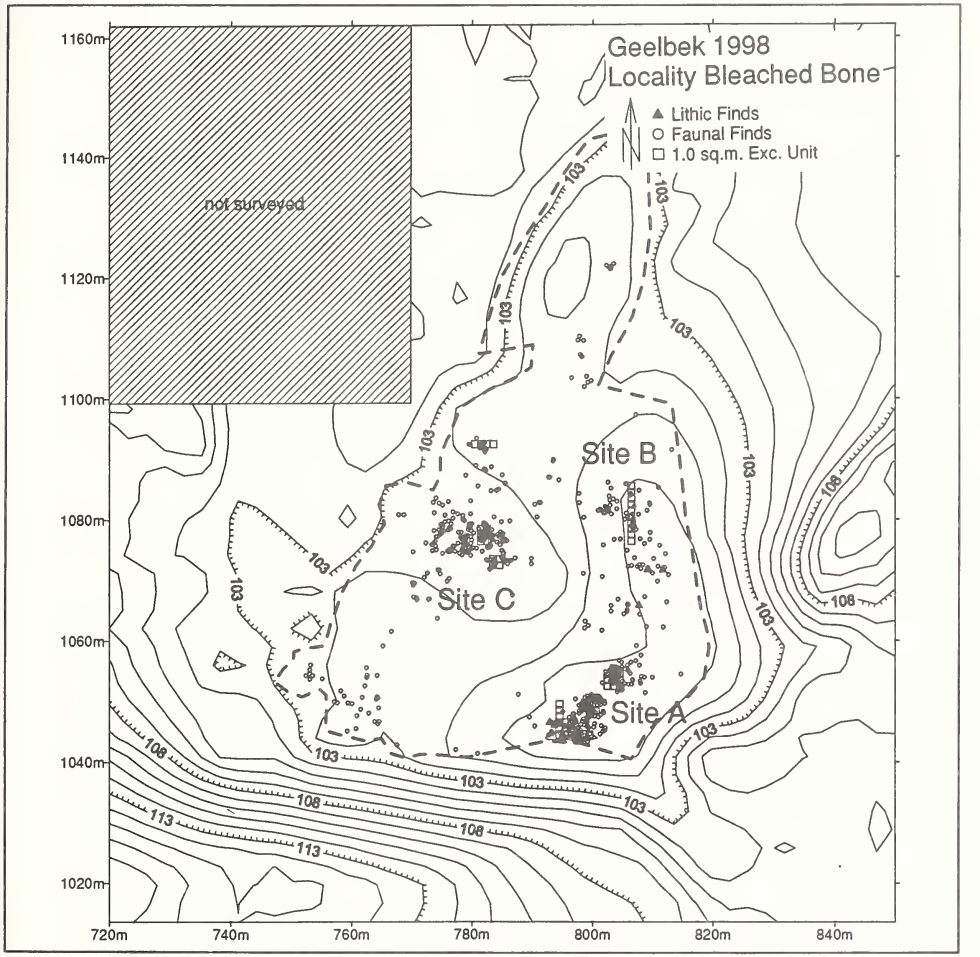

Fig. 7. Topographic position of the Bleached Bone Locality and the distribution of lithic finds, faunal materials and excavation areas.

flake recovered in Stella with a facetted striking platform shows heavy edge damage which truncates the surface patina (Fig. 11.1). Pieces such as this may indicate the re-use of long abandoned MSA elements in LSA contexts (Parkington, pers. comm. 1998). With few exceptions beige and gray silcretes are the most abundant raw materials, while quartz and metamorphosed shale are the next most abundant chipped artifacts. Granite is also abundant and appears to have been used primarily for hammer and grinding stones. Information on the sources of the different raw materials among the Geelbek finds will be used to establish links between the archaeological localities and areas in the regional landscape where lithic raw materials may originate.

Based on the detailed analysis of the archaeological data collected at Geelbek, aspects of subsistence, settlement and behavior of hominids in the Pleistocene environments of the Western Cape can be investigated. Information on both the density and spatial distribution of finds can shed light onto hominid activities. The refitting of stone artifacts should provide information about technology and raw-material economy, while the refitting of bones should offer insight into the utilization of carcasses by hominids. Close's studies (1997) of lithic conjoins in an Egyptian dunal landscape show that both intra- and intersite refitting can be applied to large, open-air localities and provide important information about patterns of mobility, settlement and technological organ-

Table 1. Geelbek. Preliminary data from the 1998 field season as available in April 1998. Examples of mammalian size classes: 0 = Microfauna; 1, 'small' = Steenbok, Duiker, Jackal; 2, 'small-medium' = Springbok, Impala; 3, 'large-medium' = Kudu, Wildebeest, Gemsbok, Zebra, Lion; 4, 'large' = Eland, Buffalo, large Equid; 5, 'very large' = Rhinoceros, Hippopotamus, Giraffe; 6 = Elephant.

	Bay 35	EDM	Bleached Bone	Alice	Stella	Total
Area (m^2)	650	1060	4440	4800	7650	18,600
Fauna	75	173	789	220	981	2238
Size Class 0	0	13	26	6	18	
Size Class 1	13	30	311	64	134	
Size Class 2&3	6	6	1	7	28	
Size Class 4	41	73	188	101	215	
Size Class 5	0	0	2	1	402	
Tortoise Shell	2	21	41	27	34	
Ostrich Eggshell	0	4	8	1	2	
Mollusca	2	1	5	2	2	
Indeterminate	11	25	207	11	146	
All Lithics	11	86	12	114	584	807
Cores	2	3	1	9	38	
Flakes	4	5	3	30	184	
Tools	4	0	1	3	28	
Small debitage 5-15mm	0	60	4	44	252	
Micro-debitage < 5mm	0	11	0	2	29	
Angular debris	0	0	0	2	22	
Artifacts, Total	10	79	9	90	553	
Manuports	1	7	3	24	31	
Excavation Units	24	122	62	23	212	443
Square Meters	24	107	58	23	86	
Quarter Meters	0	0	0	0	126	
Surface Sweeps	0	15	4	00		

ization. In combination with paleoenvironmental data such as seasonality, it should be possible to address questions concerning the time and duration of occupation, the mobility of the inhabitants and their seasonal use of the landscape.

FUTURE RESEARCH

Additional fieldwork at Geelbek is planned for the coming years. Given the promising results from 1998, no major changes in methodology or goals are anticipated. Results from the dating laboratories in Pretoria should allow new questions and hypotheses to be defined. A long-term cooperative project between the University of Tübingen, the National Parks Board, the National Monuments Council, the South African Museum, the University of Cape Town and the CSIR Quaternary Research Dating Unit in Pretoria promises to yield new insights into the Stone Age archaeology and paleoecology of the Western Cape.

ACKNOWLEDGMENTS

We wish to thank the many people and organizations for their support of this research. These include the National Monuments Council and the National Parks Board for permission to conduct research at Geelbek, the South African Museum for the use of a vehicle and for housing the finds, the Department of Archaeology at the University of Cape Town for the use of excavation and office equipment, and V. van Wyk for the use of her cellular phone. The archaeological crew is indebted to the staff of the West Coast National Park for providing an outstanding environment for living and working at Geelbek, for providing excellent meals, the transport of equipment into the dunes, and for rescuing our vehicle when it was stuck in sand. This support made the five weeks at Geelbek unusually productive. Finally, many thanks are due to our scientific collaborators and colleagues in South Africa and Germany, as well as an anonymous reviewer of this paper, who have provided us

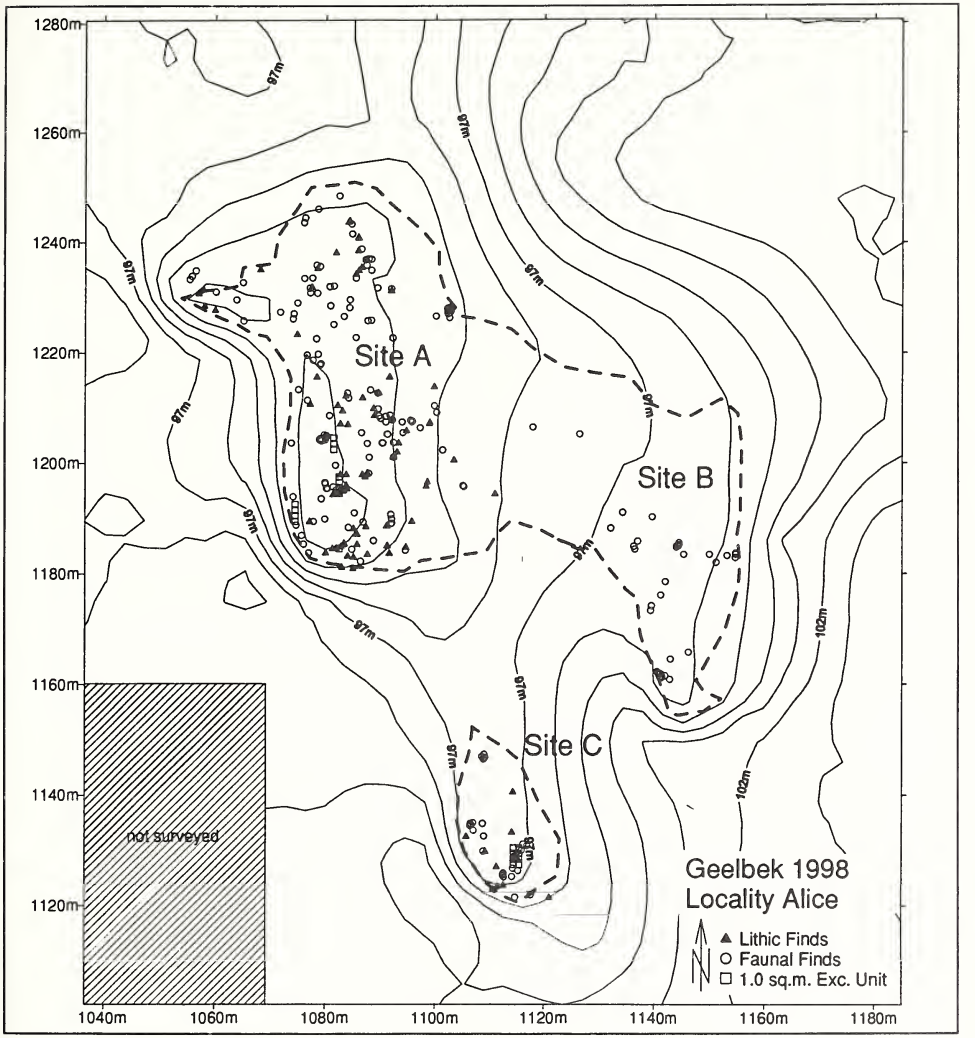

Fig. 8. Topographic position of the Alice Locality and the distribution of lithic finds, faunal materials and excavation areas.

with useful advice in many areas relevant to the work at Geelbek. The 1998 fieldwork at Geelbek was funded through the operating budget of the Department of Early Prehistory and Quaternary Ecology of the University of Tübingen. The lithic illustrations for this report were prepared by Susanne Feine.

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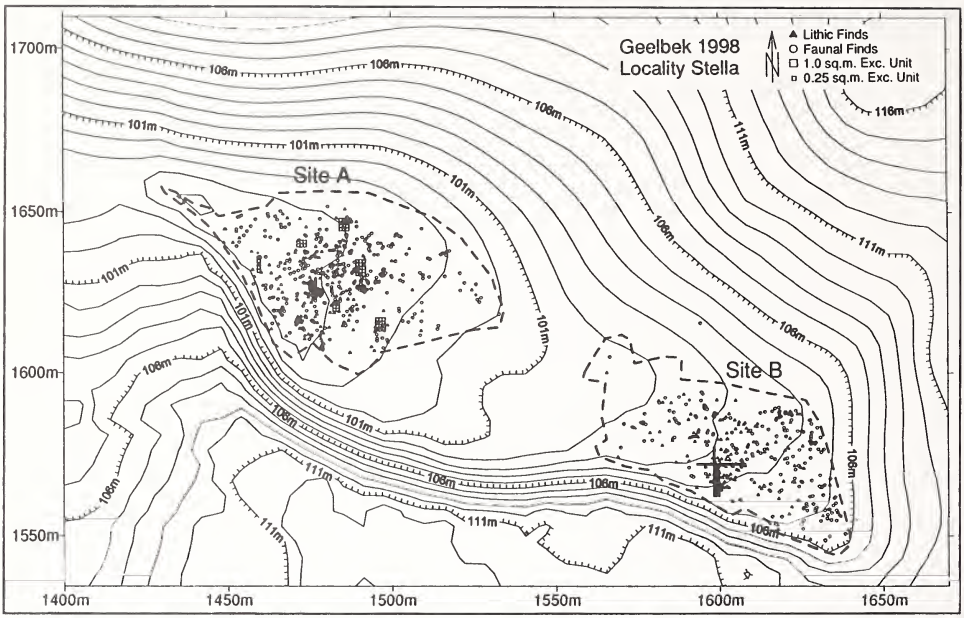

Fig. 9. Topographic position of the Stella Locality and the distribution of lithic finds, faunal materials and excavation areas.

Fig. 10. Concentration of predominantly rhinoceros bones in Stella. Site A, Scatter 1.

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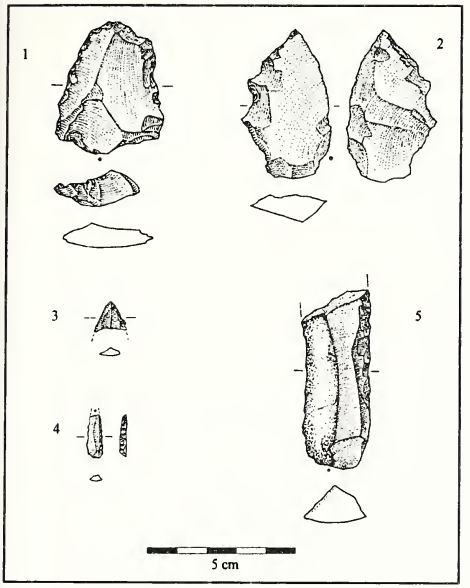

Fig. 11. Lithic artifacts from Geelbek. 1) Stella find no. 676, flake with facetted striking platform and secondary edge damage, silcrete; 2) Stella find no. 1351, denticulate, silcrete; 3) Alice find no. 372, backed piece, silcrete; 4) Bleached Bone find no. 967, base of backed point, silcrete; 5) Bay 35 find no. 103, proximal fragment of retouched blade, unknown igneous material. Scale 1:1.

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TLOKWA HISTORY: REPORT ON AN ARCHAEOLOGICAL SURVEY OF STONE-WALLED SITES IN THE NORTH-EASTERN FREE STATE*

J. DREYER

Department of Anthropology, University of the Free State, Bloemfontein, 9301

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ABSTRACT

Several previously undescribed stone-walled sites in the north-eastern Free State are recorded and considered with reference to our present knowledge about the distribution and characteristic features of Late Iron Age settlement patterns. An unfamiliar find of structures with bilobial houses (Type Z) in association with a cluster of byres with connecting walls (Type V) is addressed. This combination raises questions on the origin, association and classification of some of the sites, and it is expected that future research could add new dimensions to our current views. The north-eastern Free State represents the traditional area occupied mainly by the Tlokwa tribe of Sekonyela and Basia people of Mantatise during pre-Difaqane times. Due to a lack of archaeological information on the cultural history sequence of this area, these living sites have not been linked with the history of the early inhabitants. The paper also describes and debates rectangular stone-walled features possibly dating from the occupation by early European stock farmers.

INTRODUCTION

The Iron Age archaeology of the Free State is characterised by a wide distribution of stone-walled sites. These prehistoric structures on the flat-topped ridges have generated interest over the years and the dome-shaped stone huts (Fig. 1) in particular, have captured the imagination of both layman and scientist. Studies on the history and ways of living of the early inhabitants of the region have revealed detail and consistency in the arrangement and design of the structures. People's expression of culture has left its imprint on the material environment. Thus, recognised settlement patterns display people's perceptions with regard to social clustering, economic system and political organisation. Patterns are indicated by the arrangement of huts, byres and middens in a particular order and in relation to one another. Spatial organisation in general is characterised by the central position of stock byres and the placing of the main dwelling area on the perimeter of the settlement. From the archaeological investigations it also becomes clear that during the Later Iron Age the emphasis was not only on stone-building, for additional structures of perishable materials, supplementing living space, have also been revealed (Fig. 2). All the characteristics of settlement patterns allow the immediate recognition of specific groups of people populating the landscape.

It is important to note that the majority of stone walls erected by indigenous people in the Free State since the 17th century were built in a customary manner of two faces of stacked stones with a rubble infill (Fig. 11).

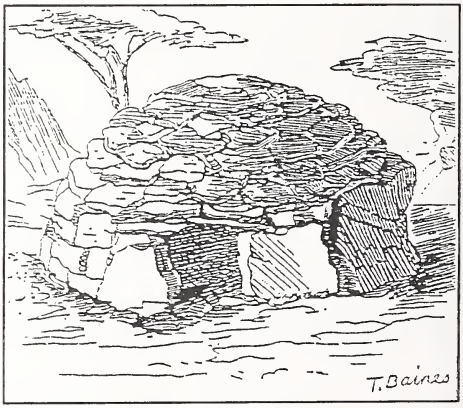

Fig. 1. Corbelled stone hut (Thomas Baines).

Furthermore, all the stone structures from the prehistoric era are either circular or oval in plan. Rectangular buildings or byres are normally either associated with missionary predominance or could represent european preference during early colonial times (*cf.* Frescura 1989).

The first major contribution to our knowledge of the prehistory of the Free State was afforded by Maggs' 1976 classification of settlement patterns recognised on aerial photographs. This classification produced a stand-

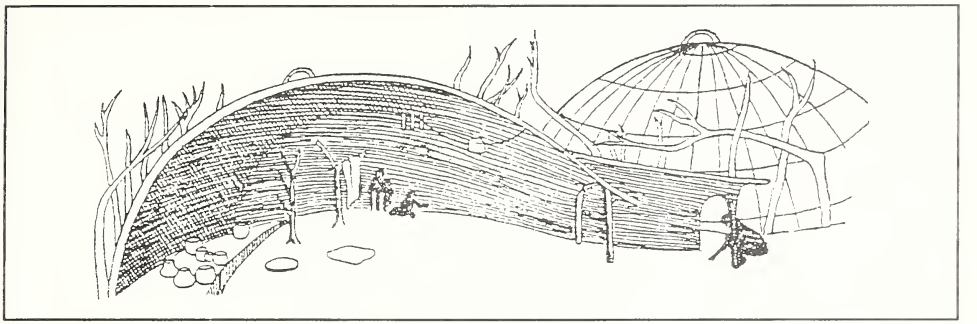

Fig. 2. Traditional hut of the Basotho (Casalis 1861).

ardised archaeological framework for the ordering of structures and sites characterised respectively by connecting walls (Type V), surrounding walls (Type N) and huts with bilobial courtyards (Type Z). Furthermore, the research indicated that the division of sites based on layout is confirmed by associated pottery assemblages with different decoration styles (Maggs 1976:290). Different settlement patterns also produced huts of different materials in different styles.

PRESENT KNOWLEDGE ON LATE IRON AGE SETTLEMENT PATTERNS

Settlement patterns and related hut types and pottery styles of the three main classes defined by Maggs (1976) for the southern highveld will now be discussed. The distribution of settlement types (Maggs 1976:38-39) and elaborate descriptions of the characteristic features of the different patterns have been given previously (Maggs 1976; Dreyer 1991,1996) and will only be summarised here.

Type V

Type V is named after Vegkop, the well known Ndebele - Voortrekker battle site of 1836 south of Heilbron. Major excavations were conducted some 50 km from Vegkop at Makgwareng (OO1) near Lindley, and at OU2(2) on Smaldeel 719, Vrede, as well as at OND3 (Tihela) in the Mequatling area, Clocolan district. Recent research at Jansfontein 368, Ventersburg, has given supportive dates and findings, but the report has not yet been finalised (*cf.* Coetsee 1986, 1987; Dreyer 1992).

Settlements classified as Type V are located in the central and eastern Free State over a considerable area roughly marked off by the towns of Marquard, Ventersburg, Senekal, Lindley and Heilbron, and in the districts of Bethlehem, Reitz, Frankfort, Warden and Vrede to the east.

Village layout consists of a group of circular or oval stone enclosures of varying sizes arranged in a rough circle, joined by connecting walls to form a large single enclosure (Fig. 3). Excavated remains indicate that huts of perishable materials were erected on the periphery some distance from the central group of stone structures (Maggs 1976; Dreyer 1992).

Corbelled stone huts were in some cases part of the central cluster of cattle byres, but are not considered as a characteristic feature of Type V settlements (Maggs 1976:28, 314). These huts were built of rough undressed stone without any mortar. To form the dome, stones were stacked in such a way as to make each consecutive circular layer smaller than the previous one, the wall thus curving inwards until the final opening at the top could be closed by a single flat stone. A very low lintelled doorway is left at ground level. Although certain individual specimens remain undamaged, the majority of these huts are in a collapsed state. The ancient appearance and the relatively small size of the structures led to a belief by local people that the huts were occupied by a now extinct pygmy tribe (Taylor 1986).

The locality of some of these huts in association with stock enclosures suggest that they could have been used as shelter or protection for young or small domestic animals. The retrieval of pottery, beads, iron implements and grinding stones on well smeared floors and hearths in courtyards in front of the corbelled huts at Makgwareng (OO1) and OXF1 (Maggs 1976) and Bekkersberg, Ventersburg (White *et al.* n.d.), proves that others were occupied by humans.

Early authors such as Stow (1905), Arboussset (1846) and Ellenberger (1912), favoured the Leghoya as the builders of the corbelled huts. Information indicates that the Leghoya eventually landed up with the Taung in the south of Lesotho (Walton 1956:27). The Leghoya assumption for the origins of the corbelled huts was followed up by Walton (1956, 1965) and Van Riet Lowe (1927), who popularised and established the name. Maggs (1976:4-5) did not fully support this view. He argued that the Type V sites could be ascribed to an occupation by Kgatla, Taung or Tlokoa peoples (*ibid* 316). In reality the distribution of Type V is too widespread for them to have been built by a single Sotho group (Maggs 1976:142). It is also true that the area occupied by the Taung coincides with the distribution of

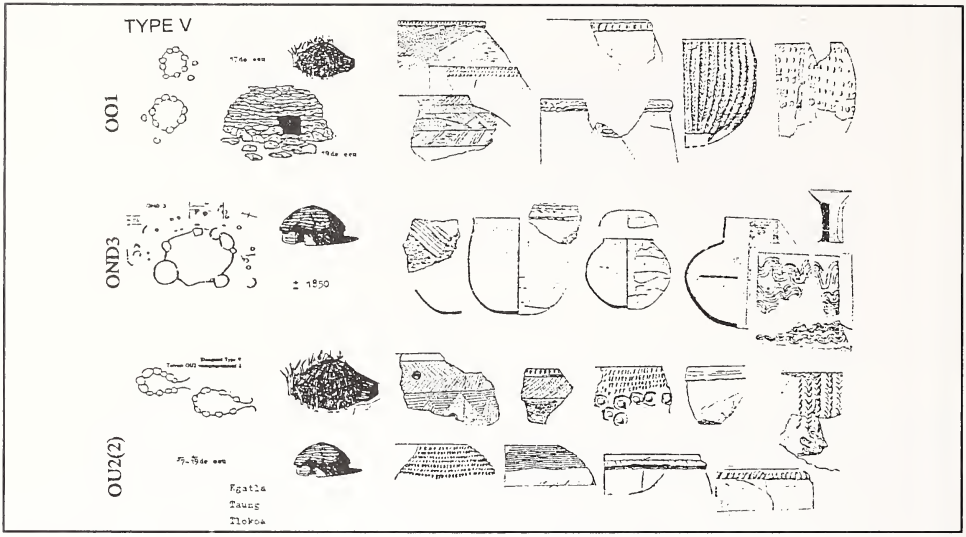

Fig. 3. TYPE V: Settlement pattern, hut type and pottery assemblage.

the corbelled stone huts in the area more to the west (Maggs 1976:5, 229, 314, 316; Arbousset 1846; Moletsane 1967).

The pottery assemblage associated with Type V is characterised by rough finger-pinched decorations in bands below the rim and on the body of vessels, and comb-stamping in pendant triangles combined with ochre burnish (Fig. 3). Pottery from OND3, however, display different vessel profiles and decoration modes (Maggs 1976:193-210).

According to radiocarbon dating and historical sources, Type V sites were occupied during the 17th to early 19th century at Lindley (OO1) and Vrede (OU2(2), and about 1850 at Clocolan (OND3).

Type N

These settlements are named after Ntsuanatsatsi (Tafelkop), a solitary hill along the road between Frankfort and Vrede. Great symbolic value is attached to the name and some Sotho still believe in an almost Biblical creation legend which proclaims that man originated from a reed bed at Ntsuanatsatsi (Ellenberger 1912:18).

Type N settlements are located in the north-eastern Free State around the towns of Warden, Frankfort and Vrede, where excavations have been done at the farms Helena, OU1 (Ntsuanatsatsi) and Zoetbron 151, OU2(1) in the lower Klip River valley.

The settlement plan shows a central complex of stock pens surrounded by a ring of domed grass huts, in their turn enclosed by boundary walls, with middens scattered on the outside. At some of the sites (OU2), Type V settlements and an elongated version of Type V (OU2 unit 2) occur. Corbelled huts are totally absent. The houses were of reeds and grass plastered with clay, and the floors consisted of dung smeared over stone paving.

The finger-pinched and comb-stamped pottery with ochre burnish, closely resemble the Type V assemblage (Fig. 4).

The occupation of Type N settlements is linked to the early Fokeng, Koena and Kgatla lineages (Maggs 1976:315). Based on radiocarbon dating and lore, Type N sites were occupied during the 15th century (OU1) and 16th to early 17th century at OU2(1).

Maggs (1976:159, 192, 315) claims that a transition in settlement pattern took place when corbelled huts were added to the Type N settlement in a restricted area at Skaaprand, to the west near Ntsuanatsatsi, transforming these units to Type V. This change allegedly took place during the 16th to early 17th century or even as late as the 18th or beginning of the 19th century. Although alterations to the walls clearly took place these ruins do not appear convincing as corbelled huts, but rather very much resemble the low stone-walled structures at Doornpoort, Winburg (Dreyer 1992). The postulated transition from Type N to Type V is also not supported by the evidence at sites on nearby Peme (Leeukop) where corbelled huts are totally absent (Maggs 1976:144).

Type Z

Type Z settlements are sparsely scattered over a relatively limited area in the vicinity of Doringberg (Maphororong) (Dreyer 1997) and Sandrivierspoort (*Mariba*), adjacent to the Sand River near the main road

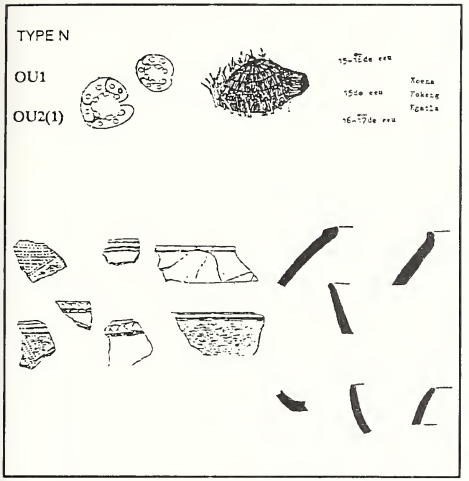

Fig. 4. TYPE N: Settlement pattern, hut type and pottery assemblage.

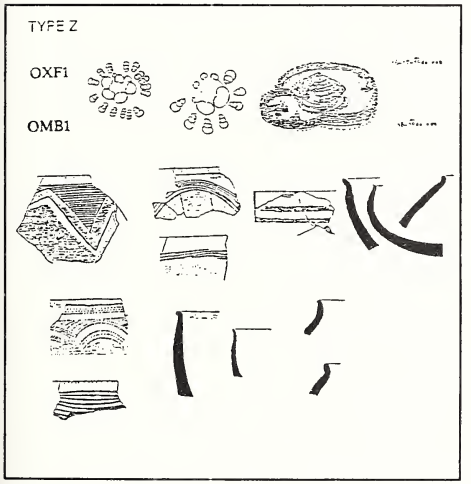

Fig. 5. TYPE Z: Settlement pattern, hut type and pottery assemblage.

between Winburg and Ventersburg (Maggs 1976:317), and to the north-west along the Vals River in the districts of Kroonstad and Bothaville, including a few sites on the Renoster River, east of Viljoenskroon (Maggs 1976:231).

Excavations were done at Matloang (OXF1 Ventersburg) and Mophathe (OMB1 Bothaville) respectively (Maggs 1976). More recent work at Jansfontein 368 on the Doringberg ridge near Ventersburg, produced new

Fig. 6. The monument commemorating eight generations of Tlokwa chiefs at Sunrise (*Nkwe*) near Verkykerskop (*Sefate*).

supporting dates (Dreyer 1992:355) but findings are still to be published (Coetsee 1986, 1987).

Hut remains inside the broader living area, normally show up as a ring of upright stones surrounding a paved floor. From this it is concluded that Type Z dwellings consisted of a cone on cylinder hut with stone-walled courtyards at both front and rear (OXF1), forming a bilobial layout. These bilobial dwellings were normally arranged around a cluster of central cattle byres. Raw materials have been substituted at different localities, resulting in a variation in Type Z settlements where clay walls replaced stone-walling of the front lobe at Mophathe (OMB1) (Maggs 1976), Middenspruit 151 on the Vals River, west of Kroonstad (personal observation by author) and near the Sand River in the Willem Pretorius Game Reserve, Ventersburg (Dreyer 1997:88).

The OXF1 type site is located on a low dolerite ridge at the farm Strydfontein 211, about 4km west of Ventersburg on the way to Henneman. According to Maggs (1976:230, 317), this area is known as Matloang, a name which is also given to Erasmusspruit south of the site.

The site consists of an elaborate arrangement of stone-walled structures. Large middens and extensive building indicate a prolonged occupation. The settlements are particularly concentrated but still leave sufficient space for easy movement. In some cases where the circular form of the byres was retained, the proximity of byres

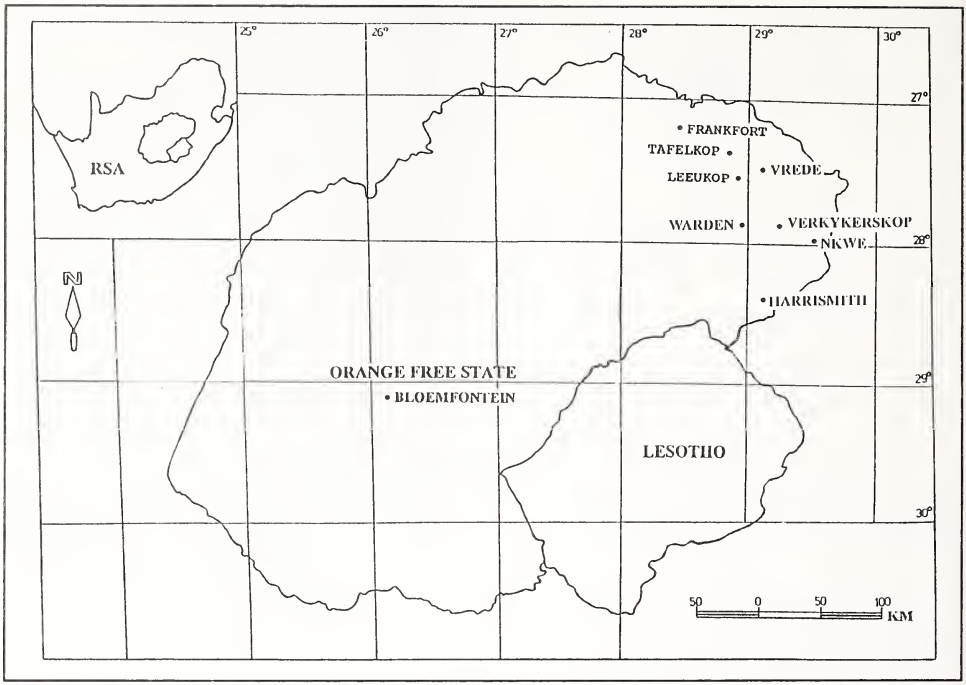

Fig. 7. Survey area.

resulted in double walling and a waste of the triangular area formed between three pens. Where the structures become crammed, it tends to be difficult to distinguish individual settlements, although the Type Z hut layout is clear throughout.

Cattle byres occupy the central area of the settlement with bilobial dwellings arranged on the outside. Maggs (1976:232) indicates the thickening of the kraal walls on either side of the entrance as a characteristic feature of the stone walling at Type Z.

No individual corbelled hut occurs in association with either bilobial dwellings or the central cattle byres, but an exceptional group of these huts is located some distance away towards the southern limits of the site. These include two circular structures of a lighter construction which might have had thatched roofs over low stone walls (Maggs 1976:244).

Pottery decorations associated with Type Z are characterised by shallow line incisions in bands and triangles below the rim and on the shoulder, combined with straight or curved lines and areas of red ochre burnish on the body of vessels (Fig. 5).

Ceramics from the corbelled hut cluster display the characteristic grooved decorations and ochre lines, similar to the rest of the Type Z assemblage. Vitrified clay, flaked stones and drawn copper wire were also recovered. Several lower grinding stones were found in association with the huts, indicating grinding as an important activity (*cf.* Walton 1951:45).

Corresponding pottery indicates that the occupation of the corbelled hut settlement was contemporary with the rest of the site (Maggs 1976:244). The variation in building style and placing outside the Type Z complex could imply a social difference and lower status in the occupants (*cf.* Ellenberger 1912:19, 56; Laidler 1936:56).

Maggs (1976:293) ascribes the occupation of the sites with bilobial dwellings to Thlaping and Rolong groups. He also states that it is possible to link Kubung people to every known Type Z settlement (*ibid.* 317). According to radiocarbon dating and oral history, Type Z sites were occupied from the 16th and 17th to early 19th century at OXF1, and 18th to early 19th century at OMB1. A single bone sample from Jansfontein 368, located to the east of Ventersburg, produced a calibrated date of 1670, which is slightly later than OXF1 (Dreyer 1992:355).

HISTORICAL BACKGROUND OF THE SURVEY AREA

The region around Warden, Frankfort, Vrede and Verkykerskop has always been accepted as the traditional

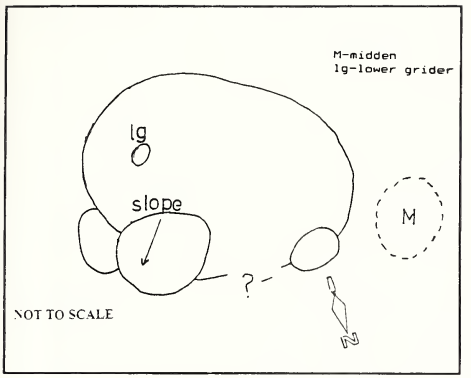

Fig. 8. Site plan Live and Hope 1074 Harrismith 2829AB.

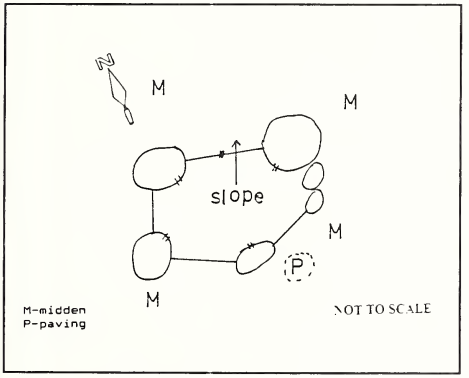

Fig. 9. Site plan Alluviaal Randt 1393 Harrismith 2829AB

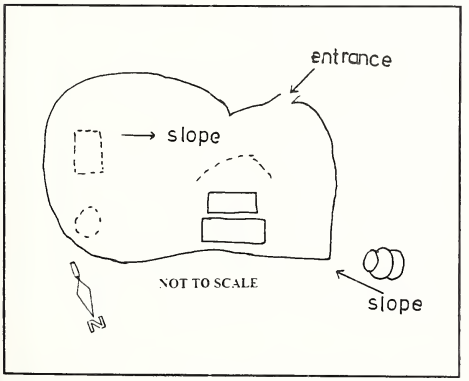

Fig.10 Site plan Unit 1 Nox 938 Harrismith 2729CD.

living place of the Batlokwa and Basia people before the Difaqane. (Ellenberger 1912; Steytler 1932; Sharratt 1968; Maggs 1976:142; Kriel 1976; Hawkins 1984).

Informed people have always been aware of the historical significance of the region and others are becoming increasingly interested in the actual history of their ancestral sites. A monument to commemorate Tlokwa heritage and to indicate the larger area in which at least eight generations of their chiefs were buried (Kriel 1976), was erected by the late Chief Wessels Mota of Qwaqwa on the farm Morgenlicht 869 (Sunrise) in 1962 (Fig. 6). According to landowners people still visit these sites regularly to pay homage through prayers and sacrifice.

Some of the more important sites are known but other Tlokwa historical sites in this region have not yet been identified. Tlokweng, where Motonosi allegedly gathered his people is indicated somewhere near the town of Vrede and the Vaal River (Kriel 1982a:25). There is also reference to Lejwe Motho, located between Ntsuanatsatsi (Tafelkop) and Vrede, where Lebaka of the Bamokgalong (Tsotetsi) group settled for some time (Kriel 1982a:21,25). This reference brings us to Leeukop (Peme), south of Ntsuanatsatsi (Maggs 1976:142). The Malakeng, an independent Tlokwa group, was also living at Seropong (Ellenberger 1912:47; Webb 1950:56), a locality which is still unknown.

Basia people were in this particular region, somewhat further up the valley of the Wilge River, always in close relation with the Tlokwa (Ellenberger 1912:119; Maggs 1976:142, 309, 316). To complicate matters further, it is known that shortly before the outbreak of the Difaqane, a group of Hlubi under their chief Motsholi came from east of the Drakensberg to settle in the Tlokwa area (Ellenberger 1912:45; Kriel 1982a:28; Kriel 1982b:21). The localities of their settlements are still unidentified.

ENVIRONMENT

The survey area is characterised by undulating grass-covered hills and ridges above low-lying stream beds. The vegetation has previously been described as the southern variation of the *Cymbopogon-Themeda* veld, characterised by a moderately dense grassveld cover of mainly *Themeda triandra, Cymbopogon plurinodis* and *Eragrostis* sp. (Acocks 1988:100, veld type 48a). The hills are almost treeless with only scatters of indigenous shrubs and karroid intrusion in places. A more recent description classifies the vegetation as Moist Cool Highveld grassland at an altitude between 1400 and 1600 m. The annual rainfall is around 600 to 700 mm (Low & Rebelo 1996:43, veld type 39).

Soils of the region originate from sediments of the Karoo Sequence upon Witwatersrand shales and lava of the Ventersdorp Supergroup (Low & Rebelo 1996:43). The height of these hills and ridges is confusing and often underestimated. The ridges with stony outcrops form the

Fig. 11. Wall construction Nox 938 Harrismith 2729CD.

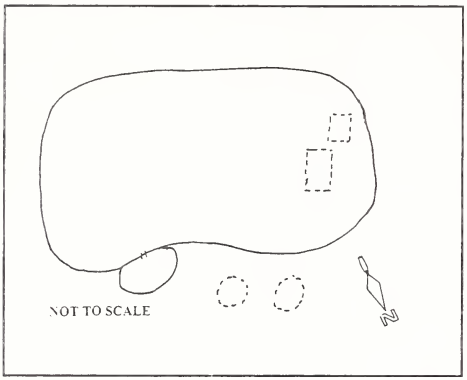

Fig. 12. Site plan Unit 2 Nox 938 Harrismith 2729CD.

locality of stone-wall remnants of the early inhabitants of the area.

THE PRESENT SURVEY

The survey involved a preliminary assessment of stone-walled archaeological sites in the north-eastern Free State (Fig. 7). The aim of the survey was to locate and record the sites, to assess their significance and to determine their cultural affinities. No excavations were done. The survey was based on an open approach to implement all the available information about the history and cultural heritage of the region. This included a review of the existing data base at the National Museum, Bloemfontein, an examination of the official 1:8000 aerial photographs and a short field visit.

Sites recorded during the present survey correspond to the criteria for the Type V settlement pattern according to Maggs' 1976 archaeological framework. Although Maggs (1976:318) associates the Type V sites with the occupation by the Tlokwa and Taung, a direct correlation

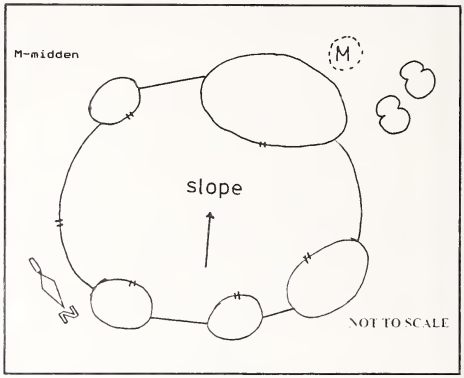

Fig. 13. Site plan Dinasdeel 1494 Harrismith 2729CC.

of the stone ruins in the survey area with Tlokwa history has not been established. Personal observations at the known Tlokwa sites (Sefate and Nkwe) showed remains of large central cattle byres without the connecting walls that are the characteristic feature of Type V.

A 1982 reconnaissance concentrated specifically on Tlokwa sites in the vicinity of Verkykerskop, while the present survey covers a wider area towards Warden. A total of 26 stone-walled settlements were identified, with another 35 possible sites to be investigated. This involved about 25 farms, but after some assessment the number could be reduced to only 5 farms containing sites of significance. A field visit was undertaken during September 1998 to locate, record and investigate the stone-walled sites for settlement pattern, pottery assemblages and other characteristics, as well as their state of preservation, and to evaluate the importance of some of the most prominent features.

STONE-WALLED ARCHAEOLOGICAL SITES

This report includes information on the location of stone-walled sites, their characteristic features and significance. It is also attempted to ascertain their cultural value and historical background.

Live and Hope 1074 Harrismith

The farm Live and Hope 1074 (28.03S; 29.23E) lies about 17 km south-east of Verkykerskop (2829 AB, 1966) in the district of Harrismith (Fig. 7). Stone-walled sites are found on the hill above the farmhouse (28.03S; 29.22E.). The settlement consists of a single large oval byre of about 35 m by 43 m diameter, with several smaller enclosures in association (Fig. 8). The walls seem to be in a fairly well preserved state. A midden is located a little distance up the slope above the byre. Undecorated potsherds were visible on the surface and a relatively large lower grinding stone was found inside the byre.

Alluviaal Randt 1393 Harrismith

Alluviaal Randt 1393 (28.04S; 29.22E) is situated in the district of Harrismith (2829 AB, 1966), about 18 km south-east of Verkykerskop (Fig. 7). Stone-walled settlements occur on the ridge (28.05S; 29.22E) to the south above the farmhouse. Although the walls have been robbed extensively, the settlement pattern is still very clear from the remaining wall foundation stones (Fig. 9). The layout consists of four oval enclosures which could be described as byres with several smaller structures in association, all linked together by connecting walls to form a single large enclosure. According to these features the settlement is classified as Type V (Maggs 1976). At least four middens could be recognised on the periphery. Undecorated potsherds were visible on the soil surface. A paved area nearby indicated the remains of a hut floor.

Nox 938 Harrismith

The farm known as Nox 938 is located (27.51S; 29.18,25E.) about 9 km north of Verkykerskop and about 34 km directly east of the town of Warden (Fig.7). A single circular stone-walled structure of about 4m diameter was found on a low lying area (27.51S; 29.17,5E.) south of the Cornelis River which cuts through the farm (2729 CD, 1987). There is no midden or further indications of occupation associated with this structure and its purpose is not clear.

Two stone-walled complexes occur on top of the hill above the river (27.50S; 29.18E.). Settlement unit 1 is situated slightly lower down towards the edge of the cliff overlooking the river to the south. The layout includes a single large enclosure (± 50 m x 25 m) which seems to be a stock byre (Fig. 10). The wall forms a clear rectangle on the north-west corner and an opening on the southern side could have been an entrance. Inside the main enclosure there are the remains of at least two smaller rectangular structures situated opposite the entrance, separated by narrow passages from each other and the outer wall. There are also the faint foundations of two features near the eastern wall on the cliff edge. A cluster of several smaller structures is found a little distance away towards the west. All the stone walls were built in the traditional manner of two faces of stacked stones with a rubble infill (Fig. 11).

Settlement unit 2 lies further to the north on top of the ridge. It consists of a large oval structure of about 25 m by 45 m (Fig. 12) with a smaller oval structure attached and opening into it. The stones of the foundation of two rectangular buildings are found inside the main enclosure.

Several other rectangular cattle byres are located in the vicinity. The context of these structures is not known. It is suggested that they could have been cattle posts during the colonial period when european farmers were occupying the area. The possibility that the material from traditional stone-walled sites was re-used by european farmers and their labourers cannot be ruled out.

Rondekoppies 1212 Warden

The farm Rondekoppies 1212 (27.40S; 29.13E) is situated about 32 km north-east of Warden, 28 km south of the town of Vrede and more or less the same distance north of Verkykerskop (Fig. 7). Presentkraal, Herklaaskop and the Witkoppe are prominent features in the vicinity (2729 CA, 1987). Several stone-walled complexes occur on this farm (27.40S; 29.13E.) and on the adjacent farm De Aar 702 (27.40S; 29.13E.). This includes rectangular stock byres and other structures that are clearly the remains of dwellings.

Dinasdeel 1494 Harrismith

The farm is situated (27.52S; 29.07E) 15 km east of Warden on the gravel road to Verkykerskop (Fig. 7). Several clusters of stone-walling are found on top of the ridge and also below the outcrop, facing the Cornelis River in the distance, with the prominent Blouberg further towards the north.

In general the stone walls are in a relatively well preserved state, while specific individual cases of site movement are indicated by the remaining wall bases, which can still be recognised on the surface (*cf.* Maggs 1976:135, on site movement). At present the walls have a height of about 0,50 m, while the lack of excess stone could indicate that the walls were originally not much higher than at present.

The settlement pattern clearly consists of an arrangement of large and smaller oval or more or less circular structures, linked together by connecting walls to form an additional larger enclosure (Fig. 13), characteristic of the Type V settlement pattern (Maggs 1976).

In one particular case on the ridge, the presence of two living units with clearly identifiable front and rear courtyards forming a bilobial dwelling typical of Later Iron Age Type Z settlements (Fig. 5) makes this site very exceptional. The stone-walling of these particular structures does not seem to be any different from the rest of the site. With the associated midden on the periphery of the settlement, it undoubtedly forms part of the entire layout. Undecorated potsherds on the surface give no indication of the pottery assemblage associated with these bilobial structures.

A combination of these specific features, *i.e.* huts representing Type Z in association with a Type V settlement pattern (Fig. 3), have never been found previously. In the other exceptional case of OXF1, corbelled stone huts characteristic of Type V occur as part of a Type Z settlement (Maggs 1976:244).

DISCUSSION

Several previously unrecorded stone-walled sites identified during the survey produced remains of two obviously different periods of occupation. The sites on Live and Hope 1074, Dinasdeel 1494 and Alluviaal Randt 1393 clearly represent a Later Iron Age occupation, while stone-walled structures on Rondekoppies 1212 and Nox 938 most likely date from a more recent period when the land must have been occupied by European farmers.

Features of several of these sites correspond with characteristics of the Type V Later Iron Age settlement

pattern (see also Allemansgras 611, Berwick 81, Sylvan 558). Others however, differ drastically from our previous knowledge and seems to indicate that different influences and priorities were important in this area during prehistoric times.

The diversity of layout patterns in the Free State shows that independent groups occupied the different settlements. It is generally accepted that the occupants of these stone-walled sites were the ancestors of the present day Sotho peoples (Wilson 1969, Maggs 1976, Evers 1984, Maggs *et al.* 1986). Although several authors refer to individual ethnic groups inhabiting the interior (Arbousset 1846; Ellenberger 1912; Moletsane 1967; Maggs 1976), we can only speculate about the occupants of specific sites. I argued in a previous publication (Dreyer 1992) that present and future archaeological studies can merely aim to identify different cultures rather than actual groups or individual leaders. In the past groups of people lived as independent political entities, or "ditjaba", and the ruling line of each had its own totem, or "seboko" (Ashton 1938). When their history is traced, confusion surrounds the application of these terms to the different groups (*cf.* Wilson 1971; Maggs 1976). The difference between lineages and political subdivisions has therefore not yet been correlated with cultural changes (Maggs 1976:318).

I also felt that the identification and classification of these defined units are of less importance in archaeological studies. If we search for lineages and tribes, we entangle ourselves in an impossible task. Therefore, the only aim should be to identify different cultures rather than to name specific groups (Dreyer 1992). In the present case, however, to clarify the history of these sites the decisive identification of a more specific cultural group is hoped for.

Although the sites have not been excavated, the characteristic features of the bilobial house layout of Type Z settlement pattern are quite obvious. No final explanation for the close association between the bilobial houses (Type Z) at a site characterised by cattle byres with connecting walls (Type V) can be given. Maggs' 1976 classification is based on the assumption that settlement layout is bound and prescribed by cultural perceptions, thus conceding to the identification of different ethnic groups from the way in which traditional peoples organised their different living places in terms of space and time (*cf.* Deetz 1967, Trigger 1968; Malan 1987). The final result was directed by cultural preference (choice) and function (Maggs 1976:285). Furthermore, the importance of livestock, personal status, kinship, social organisation and the diverse roles of men, women and offspring have always been important in the understanding of settlement patterns (Maggs 1976:23).

Bilobial dwellings have been linked to the Tlhaping and Barolong. In this case the eastern limits of the Type Z settlement pattern coincides with the known distribution of Tlhaping occupation (Maggs 1976:282). Furthermore, the building of cone-on-cylinder huts clearly depended on the availability of wood, which could have been an obstacle in the area presently under discussion. If the structures found at Dinasdeel 1494 are indeed the remnants of bilobial dwellings and more were to be found in the area, it could extend the distribution of these sites and refute Maggs' (1976:282) assumption about the absence of bilobial huts from the mainly treeless area of the eastern Free State. Further research during the second phase of the current project may clarify this matter.

Rectangular stock byres and other structures as found at Nox 938 and Rondekoppies 1212, most probably date from the early european occupation of the area. These sites have never previously been documented, described or investigated by historians and archaeologists. The origin of these structures is unknown and enquiries among people in the area offered no reasonably acceptable explanation. Wall construction consisting of two faces of stacked stones with a rubble infill seems to indicate black expertise, while the rectangular form on the other hand, tends to imply european influence.

A possible explanation may be found in the size, layout and distribution of the units. It has been narrated by the old people that in bygone days, migratory stock farmers ("trekboere") from the area and from other districts such as Standerton and Volksrust further north and east across the Vaal River, used to move their cattle on a seasonal basis to winter pastures in Natal and even to Swaziland. These treks were usually under the supervision of young european boys assisted by black herders. According to lore this movement of stock took place from long before the South African War and continued until the 1930s and 40s.

Bearing this in mind, it can be concluded that these byre sites could have been an aspect of a system of stock migration dating from colonial times. If it is kept in mind that european settlers were already herding stock, occupying land, building houses and burying their dead on the central highveld since the first two decades of the 19th century, it might be of importance to take note of these settlements during future archaeological research.

CONCLUSION

The north-eastern Free State represents the traditional area occupied by the Tlokwa of Sekonyela, the Basia of Mantatise, some Hlubi and other tribal groups during pre-Difaqane times. Due to a lack of archaeological information on the cultural history sequence of this area, these living sites have not been linked with the history of the early inhabitants. The association between the archaeological distribution and historical occupation of the area has not been clarified either and was again brought to the fore during the present survey.

Before these problems can be solved, an intensive archaeological investigation of the known Tlokwa sites is needed in order to identify their settlement pattern, house form and pottery assemblage. An elaborate recording and survey of sites in the area should be extended to include structures dating from colonial times. An association of sites and history should then be attempted.

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CORRECTION

In the September 1998 issue of the *Southern Field Archaeology* Vol. 7 No. 2, part of Table 1 from the article; The compositional relationship between pottery and its source clay part 1: an example from the work of a traditional potter on the farm Nonnashoek, Bethlehem, Free State, by L. Jacobson, W.A. Van der Westhuizen and J. Dreyer, was omitted. Table 1 should read:

Table 1. Data for the five potsherds and two clays. Base, rim and body refer to the type of sherd analyzed; "bc" is the black clay and "wc" the white clay. Major elements as oxides in weight per cent, traces as ppm. See text for further details.

	bc 8	base 0	rim 4	body 7	wc 9	base 5	body 6
SiO_2	67.00	76.27	74.74	73.39	76.81	81.04	80.62
TiO_2	0.44	0.54	0.58	0.58	0.67	0.71	0.72
Al_2O_3	13.78	13.78	14.37	14.96	10.99	11.23	11.68
Fe_2O_3	6.24	5.29	5.55	5.71	3.39	3.76	3.98
MnO	0.02	0.02	0.03	0.01	0.01	0.01	0.01
MgO	0.54	0.57	0.60	0.61	0.28	0.28	0.28
CaO	0.54	0.46	0.51	0.52	0.25	0.25	0.27
Na_2O	0.12	0.23	0.18	0.21	0.04	0.00	0.00
K_2O	1.51	1.82	1.86	1.86	1.40	1.52	1.54
P_2O_5	0.03	0.04	0.04	0.03	0.03	0.03	0.03
H_2O-	3.70	0.21	0.26	0.66	1.88	0.29	0.27
LOI	6.57	0.79	1.97	1.67	3.93	0.65	0.85
TOTAL	100.49	100.02	100.69	100.21	99.68	99.77	100.25
Rb	116	119	119	127	81	88	88
Sr	72	71	73	76	45	49	49
Y	32	36	37	38	26	30	31
Zr	195	243	253	261	358	381	390
Nb	7	10	10	11	11	13	13
Cu	17	15	16	17	6	9	9
Ni	30	25	25	26	13	12	13
Zn	62	55	55	60	32	33	33
V	91	85	85	89	96	88	87
Cr	91	74	79	81	70	65	66
Co	16	11	11	10	4	3	4

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Southern African Field Archaeology:
Johan Binneman: J.Binneman@ru.ac.za
Lita Webley: L.Webley@ru.ac.za
Alex Schoeman: A.Schoeman@ru.ac.za

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September 1999
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The aim of *Southern African Field Archaeology* is to communicate basic data to professional archaeologists and the public.

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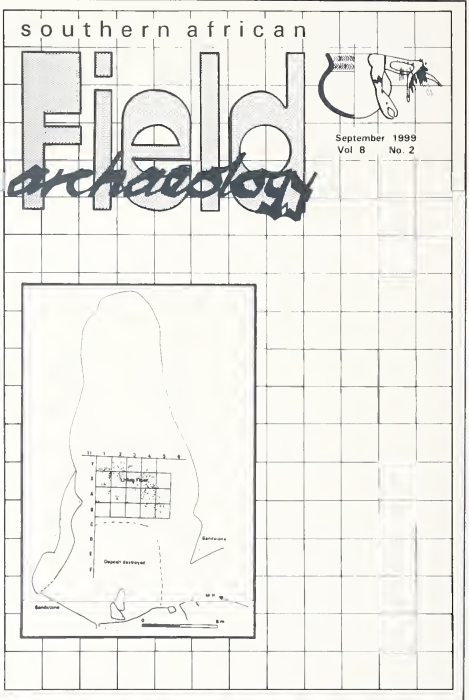

Cover illustration:
Map of a living floor with well-preserved plant remains from Strathalan CaveA, Maclear district, Eastern Cape, p. 76.

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OPINIONS

INDIGENOUS INTELLECTUAL PROPERTY RIGHTS

The terminal decade of the 20th century gave notice to southern African society of the genesis and growth of a persistent and increasingly powerful Indigenous voice. Southern Africa is more complex than almost any other region in the world when it comes to concepts of the Indigenous as we have at least three macro-Indigenous groups - San, Khoe and Black - each with further sub-divisions and inter-connections. Also, unlike most post-colonial countries not all southern Africa's Indigenous people are in a minority, disenfranchised or oppressed and many have full access to political and economic power. These empowered groups are, by and large, dismissive of the limited leverage Archaeology is able to offer them. Not so the disempowered Indigenous minority who use Archaeology, 'the past', museums and the like to publicly voice their concerns. Regular high-profile public domain events have demonstrated the potent but sometimes chaotic political power this Indigenous voice is capable of unleashing. For example, in 1994 a Nama community forcibly removed by the Apartheid government to Namibia and South Africa's Eastern Cape in 1976, successfully re-claimed land at Riemvasmaak in the Northern Cape. In 1996 the gold objects and royal burials from the 800-year old Venda city of Thulamela captured the public imagination. 1998 saw official government sanction of Indigenous minority issues with the launch of the Khoisan Legacy Project. Since 1994 the skeletal remains of the 19th-century Griqua leader Cornelius Kok II have been the subject of a tug-of-war between Wits University and various Griqua interest groups aligned under Adam Kok V. On 21st March 1999 President Mbeki ratified the return of 40 000 hectares of land in and around the Kalahari Gemsbok Park to the=Khomani San. To cap it all, on 27th April 2000 South Africa's Indigeneity was incorporated into the country's most powerful state seal - the Coat of Arms - by means of a /Xam San motto and southern San rock-painting.

These public domain events have until very recently

been preoccupied with the highly necessary and emotive issues of land restitution and with human remains. Land is important not just for financial gain – the Riemvasmaakers returned to an area ecologically less favourable that their temporary Namibian and Eastern Cape homelands – but because Indigenous identity is strongly locational – you are *where* you are. Home and place act as *genius loci* that provide a groundedness and connexion with self, place and community. Forced removals were and remain most easily enacted among Indigenous minorities because they, perhaps more than anyone, have suffered from what John Marshall aptly called 'Death-by-Myth'. Romanticised, vilified, patronised or just plain forgotten, Indigenous minorities of past and present often had to rely on non-Indigenes to carry their messages across to wider society – usually in non-Indigenous idioms. Similarly, notions of the body – especially human remains – have been used as powerful pricks of mainstream society's collective consciousness. The Sarah Baartman issue, for example, operates at all levels from the local to the global. In the more circumscribed academic world, Martin Legassick & Ciraj Rasool's '*Skeletons in the cupboard: South African museums and the incipient trade in human remains 1907-1917*' has ruffled many a feather and – understandably – rational thought has sometimes gone out the window.

But perhaps the issues of land restitution and the body have now established a platform for the next phase of the Indigenous voice's development - Indigenous intellectual property rights. Here the trick will be to make Indigenous knowledge translatable and powerful in a world in which dominant and non-Indigenous interests push their agendas trans-nationally; usually with little regard for Indigenous intellectual property rights. A step in the direction of mutual knowledge partnerships was taken in 1997 with the *1st Khoisan Identities and Cultural Heritage* conference in Cape Town where both Indigenous academics & interest groups and non-Indigenous academics participated. Communication, mis-communication and a healthy unease marked this partnership in knowledge about the past. But Indigenous intellectual property rights are by no means restricted to the past and play a far more important role in the present. For Indigenous interest groups to be successful they require knowledge of the wider world and the confidence to engage with it on an equivalent footing. Organisations such as the Kuru Development Trust in Botswana; the !Xu and Khwe Cultural Project in South Africa and the umbrella Working Group of Indigenous Minorities in Southern Africa (WIMSA) have all managed to promote Indigenous advocacy, often combined with measures of commercial success. Kuru, for example, have a very successful art project that makes judicious and empowered use of technology – www.africaserver.nl/kuru – to sell modern Naro San art. Similarly, in February 2000 the Snuneymuxw First Nation of Canada's Gabriola Island used Canadian Intellectual Property law to protect an ancient heritage by trademarking 10 sacred rock-engravings. These images may not be used commercially and are now "considered the official marks of the Snuneymuxw First Nation, in the same way the Canadian flag is considered an official symbol of Canada" (Tanner 2000). Trademark differs to copyright - which has a finite exclusivity clause linked to the life plus some years (usually 70) of the creator of an original work; after which time that work passes into the public domain. Trademark is potentially infinite and protects commercial and intellectual reputations against insensitive use.

In southern Africa there are many instances of non-Indigenous public domain uses and abuses of original Indigenous works and intellectual property. In literature there is, for example, Stephen Watson's '*Return of the Moon*' based on /Xam oral literature and Zakes Mda's '*The Heart of Redness*' based on Xhosa magical realism and the prophetess Nongqawuse. In film we have Jamie Uys's '*The Gods must be crazy*' and the Foster brothers' '*The Great Dance*'. T-shirts, wine bottles and Sun City make money from ancient images. Though much of this cultural appropriation is good as it proudly and widely makes the Indigenous past present, it is often partial and does not make provision for an Indigenous voice *per se* to be heard or for recognition and compensation to return to the Indigenous creators of those works and knowledge. For example, in mid-2000 controversy erupted in South America and South Africa over non-Indigenous botanists and pharmaceutical companies making one-sided profits from millennia of Indigenous knowledge of medicinal plants (George & van Staden 2000). Could the same be said of archaeologists who make a living – of sorts – by interpreting cultures other than their own? Perhaps, though here there is the twist that archaeologists often find themselves in the acutely uncomfortable position of knowing more about aspects of Indigenous culture than the relevant Indigenous people. In these cases we can and do help re-connect people with knowledge lost in the mess of forced removals, persecution and 'death-by-myth'. Museums and universities function as 'keeping places' for knowledge and objects. But this knowledge and material culture cannot just be 'kept' and should be used to help seed projects such as the Indigenous development of the San Education and Cultural Centre near Darling in the Western Cape. UCT's Clanwilliam Living Landscape Project is another good example of applying kept knowledge. Perhaps southern African Indigenous groups could themselves employ archaeologists, like the Indigenous Ngai Tahu of New Zealand's South Island who employ a non-Ngai Tahu archaeologist to research, manage and publicise their pre-colonial history. Such partnerships are not equal but they are equivalent and they take as their initial premise the primacy of Indigenous intellectual property.

In the new millennium we may see an intensification of these knowledge partnerships in southern Africa with the WIMSA initiative to invite both commercial interests and academics working on issues that closely concern contemporary Indigenous groups to jointly sign a partnership-style contract designed to protect Indigenous intellectual property. "Does the research subject matter involve any intellectual property of a form that requires special protection? If so, what arrangements have been made to

protect [these] rights?" reads a draft of the contract. Of course, such a contract will need a great deal more negotiation – Indigenous groups are by no means homogenous and non-Indigenous researchers should not have their academic freedom interfered with unfairly. But closer co-operation in the form of consenting, genial and courteous partnerships – sometimes just sending copies of one's articles to Indigenous interest groups – may help responsibly introduce new flavours and a visceral humanity into the practice of Archaeology. Perhaps more partnerships between Indigenous systems of archaeological knowledge and non-Indigenous Archaeology will help further de-colonise our discipline.

> *I want to see the Bushmen write their own history so that we can interpret our own language, because when you are translating everything, you lose things, we need to write our own history.* (Kxao Moses #Oma, in Weaver 2000).

Sven Ouzman
Rock Art Department
National Museum

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ANIMAL BEHAVIOUR AND INTERPRETATION IN SAN ROCK ART: A STUDY IN THE MAKGABENG PLATEAU AND LIMPOPO-SHASHI CONFLUENCE AREA, SOUTHERN AFRICA*

EDWARD B. EASTWOOD

Palaeo-Art Field Services, P.O. Box 168
Louis Trichardt 0920, South Africa
and
Rock Art Research Centre, University of the Witwatersrand
Private Bag 3, Wits 2050, South Africa

COLIN BRISTOW

Eco Logical Safaris, P.O. Box AC 384,
Ascot, Bulawayo, Zimbabwe

and

J. A. VAN SCHALKWYK

National Cultural History Museum, P.O. Box 28088,
Sunnyside, 0132, South Africa

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ABSTRACT

Selected rock paintings of animals exhibiting specific behavioural traits are examined with special emphasis on kudu in the rock art of the Makgabeng Plateau and the Limpopo-Shashi Confluence Area (LSCA). Primary identification by morphological characteristics is essential for determining the taxonomic status of animals in rock art. Ethology, the study of animal behaviour, then becomes a second refining and defining procedure, and may help to identify otherwise unidentifiable animals in the art, sometimes enabling a match between ethnographically recorded San hunter-gatherer beliefs about animals. Although animal behaviour is implicit in many rock art studies, it is suggested that explicit critical awareness of ethology can provide for more in-depth interpretation of rock engravings and paintings of animals.

INTRODUCTION

It is by now widely accepted that hunter-gatherers world-wide were keen observers of animal behaviour and often incorporated this behaviour in their cosmologies (see, for example, Mails 1972; Campbell 1976; Eliade 1989; Cowan 1989; York *et al.* 1993). The San were no different and many authors have commented on their acute observational skills, especially where animals that the San regularly hunted were concerned (*e.g.*, Marshall Thomas 1959; Vinnicombe 1976; Lewis-Williams & Biesele 1978; Shostak 1981; Biesele 1993). Nicholas Blurton Jones and Melvin Konner's landmark study showed, for example, that !Kung hunters had remarkable abilities in observing animal behaviour, that these observations went beyond the immediate needs of hunting, and that information such as predator behaviour acquired during the hunt would be transmitted in an informal way through stories in the more relaxed social setting of the camp (1976:344). Moreover, the periodically precarious nature of survival, particularly in semi-arid environments, especially the pursuit of prey animals for protein, and, more importantly, fats (see for example, Speth 1990) - compelled hunters to use supernatural powers in order to transcend their human limitations (Biesele 1993:89, 195). Indeed, in the far northern parts of South Africa and in south-western Zimbabwe, hunter-gatherers used animals as cultural symbols as evidenced in the rock art (*e.g.*, Eastwood

1999; Eastwood & Cnoops 1999). Animals which were regularly hunted do not necessarily correspond to animal species which were chosen as subjects to paint (*e.g.*, Maggs 1967). The choice of animals for depiction in the art related closely to San hunter-gatherer social practices and religious beliefs (*e.g.*, Vinnicombe 1976). Apart from a rich store of recorded folktales where animals played a central role, the prolific and ubiquitous paintings and engravings of a restricted range of animal species all over southern Africa testify to the importance of these animals in San thought over time and space.

During the summer of 1974 David Lewis-Williams joined Megan Biesele at a camp near Maun in the Kalahari in order to interview !Kung informants on aspects of their beliefs which might have a bearing on specific aspects of Southern San rock paintings. In discussions with the !Kung it became clear that:

> It is in the interpretation of animal species, sex, groupings and postures that contemporary San informants, can, I believe, be of greatest assistance in understanding the content of particular rock paintings; this is a field of study that still awaits extensive exploration (Lewis-Williams 1981:36).

In spite of Lewis-Williams' suggestion, very little specific work has been done on animal behaviour in southern African rock art, although assumptions about identification and behaviour have been implicit in most rock art research (see, for example, Fock 1972; Woodhouse 1984; Loubser *et al.* 1990). Some specific research on animal behaviour in rock art has been done elsewhere, notably the Upper Palaeolithic (Clottes *et al.* 1994). In southern Africa the work that has been done has shown that paintings and engravings of animal species often display a range of postures and behavioural characteristics suggesting movement or stasis (*e.g.*, Pager 1993:457, 1995:81), near-death states (Lewis-Williams 1981:92), mating and the care of young (*e.g.*, Pager 1975:39, 40; Lewis-Williams 1981:47; Lenssen-Erz 1994; Ouzman 1996; Eastwood & Cnoops 1999), or they are painted in groups indicating aggregation behaviour (Loubser & Brink 1992), territoriality and seasonal social structure (*e.g.*, Vinnicombe 1976:163; Mazel 1983; Lenssen-Erz 1994; Eastwood & Cnoops 1999). In some studies it was clear that an appreciation of basic ethological principles and an understanding of the San ethnographies is required in order to interpret the art (*e.g.*, Lewis-Williams 1981; Ouzman 1995a, 1995b, 1996, 1998; Eastwood & Cnoops 1999). Without some knowledge of animal behaviour the researcher may overlook nuances of specific classes of animal image that may shed light on interpretation. Indeed the rock art researcher, who is often someone not fully conversant with animal identification and behaviour, may not recognise certain postures displayed by an engraved or painted animal at all and simply ignore what may be a significant clue to the intentions of the artist.

Understanding animals in the wild depends, first, on their accurate identification, secondly, their ecology, and thirdly, their behaviour. Behaviour is, perhaps, the most revealing part of an animal's natural history. Similarly, in rock art, initial interpretations of animal imagery depends on their identity, iconographic context and behaviour. More crucial, however, is understanding the way in which animals were incorporated into San beliefs (*cf.* Biesele 1993; Deacon 1994; Guenther 1994).

Comprehending aspects of animal behaviour is useful to rock art research because, in some cases it may help to identify animal species whose general body form and morphology are not sufficiently diagnostic for a positive, unambiguous identification, and it facilitates the interpretation of certain images in the art in at least two ways. First, behavioural nuances may elaborate on `non-interesting' repetition of animal images, making them more intriguing, even if such connotations are not perfectly understood. Secondly, and far more forceful than the first, is the way in which identifying behavioural traits can help with interpretation, especially when it is combined with the ethnography.

In this paper we explore these possibilities and to illustrate our arguments we draw on the art of the far northern parts of South Africa and south-western Zimbabwe. Our study areas are the Makgabeng Plateau and the Limpopo-Shashi Confluence Area (Fig. 1). The Makgabeng plateau, situated to the south of the Blouberg massif, covers an area of some 300 square kilometres, consisting of broken, horizontal sandstone sediments of the Waterberg Group. The vegetation consists of Mixed Bushveld (Low & Rebelo 1996). The Limpopo-Shashi Confluence Area (LSCA) consists of roughly parallel series of Karoo Sandstone outcrops and typical Bushveld woodland interspersed with *Colophospermum mopane* scrub. In this study there are several reasons to justify the use of Kalahari ethnographies. First, these two rock art study areas fall within the eastern Kalahari-fringe area. Secondly, the environment and fauna are similar, and allow for similar responses to the environment by hunter-gatherers. Thirdly, and most significantly, there are many correspondences in the art of the study areas with most rock art regions in southern Africa (see Eastwood & Cnoops 1999).

ETHOLOGY AND IDENTITY

Identification by Primary Morphological Attributes

Given that San rock art is largely symbolic and non-literal (*e.g.*, Vinnicombe 1976; Lewis-Williams 1981), it is hardly surprising that some animal paintings are seldom depicted as accurate two-dimensional replicas of three-dimensional animals. Paintings of eland in the south-eastern mountains of South Africa, for example, are generally depicted with exaggeratedly long torsos, a convention which may have been intended to convey the extra-ordinary origins of these spirit-animals. Moreover, painted images may be a conflation of more than one animal species (see for example, Ouzman 1997 for the conflation of images of cattle, wildebeest and eland).

Indeed, many animals in the art appear to be of

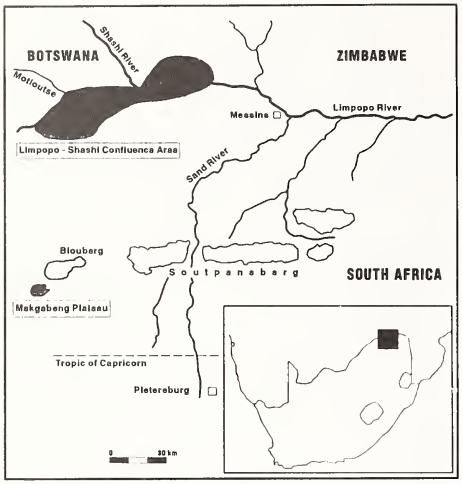

Fig. 1. Map of part of the Limpopo Basin of southern Africa with the study area shaded.

indeterminate species, especially in the largest category of all animal paintings: antelope. In the LSCA, for example, the most recent analysis of 119 sites shows that `indeterminate' antelope make up 70% of the total number of painted antelope (n=475; Eastwood & Cnoops 1999). It is often difficult for researchers to identify species-specific antelope from the vast repertoire of indeterminates. In recent surveys of the LSCA we have often had pointed out to us by professional hunters or trackers that some antelope we had identified as indeterminate were in fact identifiable by body silhouette and other features. An example of such misidentification was apparent when we recorded a site already documented by Pager (n.d.) in the 1970s. He had counted eleven species-specific antelope out of forty-one images of antelope, while we counted seventeen identifiable antelope (Eastwood & Cnoops 1998a:34). We therefore suspect that many of these `indeterminate' antelope may have similarly been misidentified in other quantitative studies. Indeed, throughout southern Africa, quantitative studies almost always show that indeterminate antelope are the largest category of animal images (*e.g.*, Maggs 1967; Pager 1971; Lewis-Williams 1972, 1974; Hollman 1993; Laue 1999; and see Erwee 1997 for discussion of these `indeterminate' antelope).

Examining the general form and structure of rock paintings of animals may give an idea of the taxonomic group to which the animal belongs, for example, family, tribe, genus or species, depending on the combinations of morphological characteristics which are portrayed. An example of this is the problem of identifying two members of the Tribe Alcelaphini of the Family Bovidae, the red hartebeest (*Alcelaphus buselaphus*) and the tsessebe (*Damaliscus lunatus*) in the study areas. The alcelaphines:

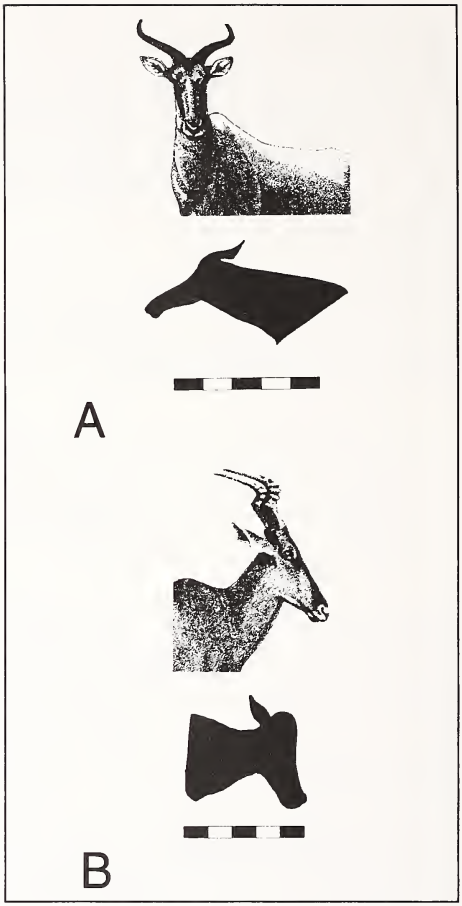

Fig. 2. Comparison between head shapes and horn structure of tsessebe (A) and red hartebeest (B). The topmost animals are realistic sketches (after Smithers 1983: plate 25). The two lower depictions are rock paintings from the Northern Province. Scales in intervals of 10 mm.

wildebeest, tsessebe and hartebeest are identifiable by shoulder-hindquarter orientation, body markings and horn shape. Differentiating between hartebeest and tsessebe, for example, where horns are borne by both sexes in reality, is often problematic in the paintings because horns are often absent. Perhaps these omissions are intentional, indicating a `generic meaning' for these two alcelaphines, possibly indicating a set of concepts applied to these closely related genera. In the LSCA rare depictions of both red hartebeest and tsessebe are painted with horns and are therefore readily identifiable; real tsessebe characteristically have horns which curve uniformly backwards, outwards and then slightly upwards and inwards, while the hartebeest have horns that arise straight

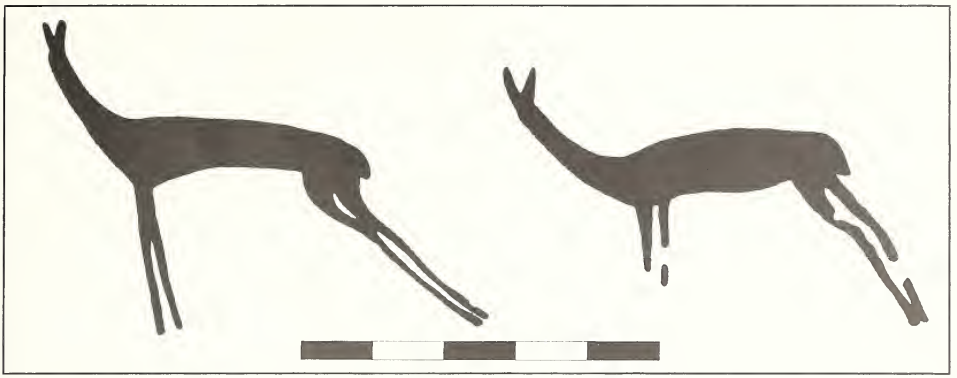

Fig. 3. Two small antelope from the Brandberg (after Pager 1993:116). These animals show territory-marking postures common to both impala and gazelle species. Black represents red. Scale in intervals of 10 mm.

up from a pronounced pedicle and curve forward and then backward. Because their body silhouettes are so similar, that is, the back slopes down from shoulder hump to hindquarters, paintings of these two genera are generally difficult to differentiate in the art. Nonetheless, some hornless depictions can be identified from the head shape where the pronounced pedicle on the hartebeests' heads are depicted, but is absent from depictions of tsessebe (Fig. 2). Generally, however, depictions of hartebeest are characteristic of the Makgabeng Plateau and tsessebe of the LSCA - which conforms to present distribution of these two animals (Smithers 1983:611, 618).

The identity of other painted antelope which are predominant in the study areas such as kudu and impala are much less problematic. Kudu (*Tragelaphus strepsiceros*), for example are recognisable by their shoulder humps, large ears, robust muzzles, relatively long necks, body stripes, horn structure (if male) or two or more combinations of these features. Paintings of impala (*Aepyceros melampus*) are also diagnostically unambiguous and relatively easy to identify because they are often bichrome with white underbellies, their limbs are relatively slender, their ears are large, they do not have pronounced shoulder humps and their backs do not slope to the rear.

Another category of animal paintings which is characterised by blurring of species-specific features are members of the Family Felidae. Paintings of large felids are generally identifiable by their heavy builds, robust legs, relatively long tails which dip down from the body and then upwards, a shoulder hump and slightly lowered head. Species-specific features such as the mane of the male lion (*Panthera leo*), or the spots of a leopard (*Panthera pardus*) or cheetah (*Acinonyx jubatus*) are rarely depicted. This blurring of species of felids may be understood when one looks at the Kalahari ethnography: *!'homb* in the Ju/'hoan language means carnivores in general and is extended to refer to black and white people who may constitute a threat (Biesele 1993:111), and the generalised forms of felids in LSCA art may also point to ideas about felids in general, rather than a particular species.

Despite the absence of diagnostic morphological features in many animal paintings, it is generally obvious to rock art researchers that accurate identification of animal families, tribes, genera or species in the art is a necessity for interpretation since many specific San beliefs and concepts are linked to particular animal taxa. We now turn to examine the possibilities of identification by behavioural features.

Identification and Behavioural Attributes

We suggest that, in some cases, observation of behaviour in the images may give some clue as to the identity of certain antelope. To illustrate this we use an example of two apparently indeterminate antelope from the Brandberg (Fig. 3). The way their legs are extended backward is a typical posture of male territory marking in both impala and springbok (*Antidorcas marsupialis*) (Smithers 1983:629; Estes 1991:163). Although the Brandberg falls outside the distribution area for impala (*e.g.*, Stuart & Stuart 1988:210), it does not necessarily follow that this was the case in the past when the paintings were made (*cf.* Tyson & Lindesay 1992), nor does it take into account depictions made of animals from other places by transhumant people (see Ouzman 1995b). The behavioural attributes have thus narrowed down the options for identification of these two antelope, but further examination of specific morphological charac-teristics - in this case the relative size of the ears - allow the antelope to be identified; impala have very large ears relative to head size, whereas the antelope depicted have smaller ears and are therefore likely to represent springbok.

It is not only antelope, however, that can be identified by behavioural traits, but other animals as well. A panel recorded by Pager (1977) in the LSCA is a good example (Fig.4). This panel of paintings portrays a group of eleven animals in a row of seven and a cluster of four oriented

Fig. 4. These animals are identifiable as mongooses primarily by their alignment and not by silhouette (Redrawn from Pager 1997, fig. 3). Limpopo-Shashi confluence area, South Africa. Black represents red. Scale in intervals of 10 mm.

semi-vertically. The animals range in length from 15 to 27 mm in length and 4 to 7 mm at shoulder height. These animals generally have the silhouettes of carnivores. Their general outline suggests that they belong to the Family Canidae - either wild dogs (*Lycaon pictus*) or black-backed jackals (*Canis mesomelas)*. Although they have a general canid appearance and are aligned in a way that suggests a hunting pack, their tails are too bushy and ears not rounded enough for wild dogs. The second, and better, possibility is their identification as jackals - consistent with their rather bushy tails and the angular form of ears and foxy muzzles (*cf.* Estes 1991:404). This choice, however, is also complicated by their alignment and gregarious arrangement - wild dogs hunt in packs, while jackals are solitary hunters. The average size of a wild dog pack is ten animals (Pienaar 1969), about the size of the group in the paintings, while jackals are generally found in monogamous pairs (Estes 1991:398). This dilemma of identification is solved by a third possibility: that they belong to the Family Viverridae. Indeed, Pager (1977) identified these animals as mongooses, but without arguing why he chose this designation. We, however, agree with this identification for the following reasons: first, the long squat bodies (length to height ratios) of the paintings are similar to the appearance of a mongoose. Secondly, their body to tail-length ratios are more consistent with those of mongooses rather than canids. Thirdly, their small size when compared to other paintings of animals in the shelter (the mean length ratios of mongooses to other animal images are approximately 1:12. In another shelter in the area similar paintings have a 1:18 mean length ratio with animals in the same panel). Although this presupposes that San images are painted in proportion, these unusually

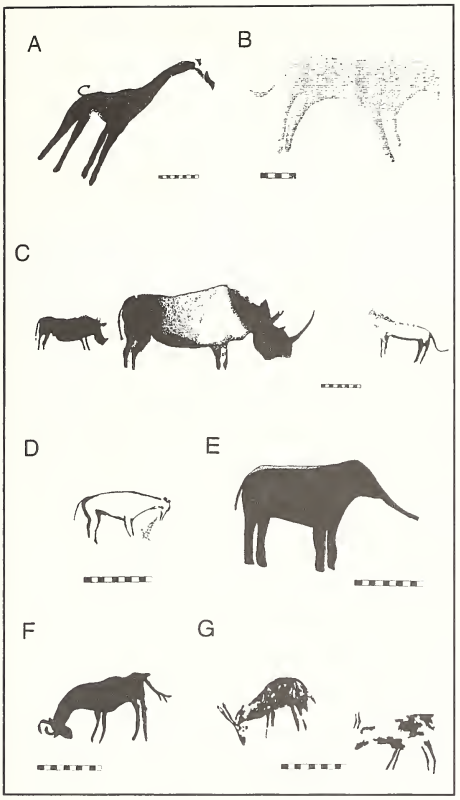

Fig. 5A. A giraffe exhibiting a gesture of alarm. Limpopo-Shashi confluence area, South Africa. Black represents. Scale in intervals of 10 mm. represents red. Scale in intervals of 10

5B. A large felid in typical standing or walking posture. Limpopo-Shashi confluence area, South Africa. Grey represents yellow. Scale in intervals of 10mm.

5C. A white rhinoceros with calf facing a lion. Limpopo-Shashi confluence area, South Africa. Black represents dark red, stipple represents faded red. Scale in intervals of 10mm.

5D. Antelope with head lowered, bleeding from the nose. Limpopo-Shashi confluence area, Zimbabwe. Black represents dark red, stipple represents light red. Scale in intervals of 10mm.

5E. An elephant exhibiting 'greeting-intention' behaviour. Limpopo-Shashi confluence area, Zimbabwe. Black represents black, outlined stipple represents red. Scale in intervals of 10mm.

5F. A wildebeest cavorting - either territorial or mating behaviour. Limpopo-Shashi confluence area, South Africa. Black represents red. Scale in intervals of 10 mm.

5G. Two bushbuck in defensive and offensive postures. Limpopo-Shashi confluence area, South Africa. Black represents red. Scale in intervals of 10 mm.

small painted animals (mean length 19 mm) suggests that they represent small animals; generally, in the LSCA where kudu and impala and/or tsessebe/hartebeest, and, indeed, other animal species, are depicted together in the same panel and in the same episode it has been noted that they are more or less in proportion. Fourthly, and most important, the arrangement of the animals in processions depicted at two sites signifies a gregarious species. The only gregarious animals with long tails and squat, slender bodies are either the dwarf mongoose (*Helogale parvula*), or the banded mongoose (*Mungos mungo*). Both species are a relatively common sight in the region. When packs are encountered they flee, uttering a strident, chittering alarm signal and often run in single files, much like those port-rayed in the paintings. In the case of these mongoose paintings, the animals are more readily identifiable from their linear alignment, than from their body form. Thus, behavioural attributes, we argue, may contribute toward identification.

When once the identity of an animal painting is established by examining combinations of morphological features, ethology then becomes a second refining and defining step. Although an aid to identifying paintings, ethology is useful to rock art researchers in the more important realm of interpretation.

ETHOLOGY AND INTERPRETATION

Ethology, the scientific study of animal behaviour, is a useful tool in interpretation of rock art images in at least two ways. First, it points to the unusual nature of some paintings of particular species that, at first glance, may seem merely repetitious images. In other words, a slight change in the posture of a particular animal painting that is frequently painted in a static demeanour may represent a crucial variation and may help with interpretation. Secondly, ethology combines powerfully with ethnography to illuminate the extra-ordinary meanings of certain paintings. We now examine images of identifiable animals in various postures which exhibit a range of behavioural characteristics.

Identifying Animal Behaviour in the Art

In our examination we draw on the work of Reay Smithers (1983) and, in particular, the work of Richard Estes (1991). Estes points out that the problem of categorising animal behaviour is that most behaviour patterns overlap. For example, `Social Organisation' would include `Territoriality' and `Mating Systems', which reappear under `Reproduction' and `Parent/ Offspring Behaviours' and so forth (1991:xxi). Despite the apparent overlaps, in the following framework we have simplified and adapted Estes' system and include most of his designations. An additional category, `Behaviour in Death', has been included because San hunters often portrayed dying animals in certain parts of South Africa (*e.g.*, Lewis-Williams 1981:92; Lewis-Williams & Dowson 1989:50-52). Our framework takes

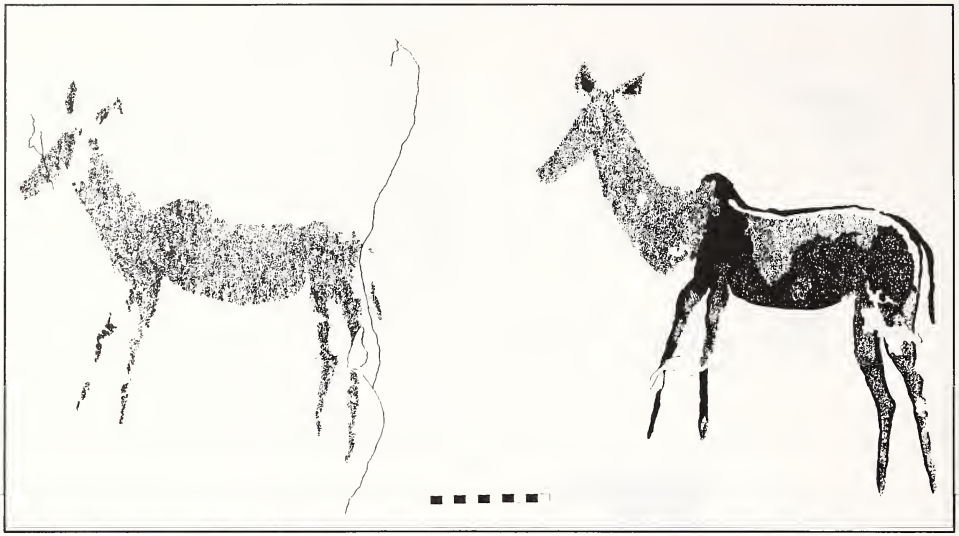

Fig. 6. Two kudu cows exhibiting postures of inquisitiveness or subtle agonistic behaviour of caution. Limpopo-Shashi confluence area, Zimbabwe. Black represents dark red, heavy stipple represents light red, light stipple represents yellow. Scale in intervals of 10 mm.

into account the various animal behaviours which are consistent with images found in the art. In the following section we discuss five categories with reference to specific images found in rock paintings. These categories include `Postures and Locomotion', `Predation and Anti-predator Behaviour', `Behaviour in Death', `Social Behaviour' and `Reproductive Behaviour'.

Postures and Locomotion

This refers to attitudes assumed while seated, sleeping, standing, feeding, or any locomotory behaviour. Of all the potential postures and locomotory positions - only a few are depicted in the art. In other words, the San were selecting a restricted range of postures, as they did with human figures. The examples given below (Figs 5A-G) illustrate the nuances of posture that may be shown in paintings of animals. Most animals portrayed in the art appear to be 'simply standing there' but there are many examples of animals that lie down, walk or run. For example, an unusual depiction of a giraffe (*Giraffa camelopardalis;* Fig. 5A) from the LSCA is tilted slightly forward giving the impression of movement - perhaps cantering. Indeed, the swept-back tail suggests this. When one approaches a giraffe it usually runs off, apparently in slow motion, the tail held curled up on the rump and switched at regular intervals (*cf.* Estes 1991:204). One of the authors (Bristow) has observed this behavioural trait during courtship, when the female is in oestrus. Like many other paintings of animals this idiosyncratic image is difficult to interpret either from the point of view of its context, or indeed, the ethnography. However, if the intention of the artist were concerned with the mating and consequent parental behaviour of specific animals it would make more sense because, as we later explain, such behaviours in animals resonated with San hunter-gatherer socio-cultural concepts.

Predation and Anti-predator Behaviour

These two categories are set in opposition: predatory behaviour is characteristic of carnivores (killers and eaters of living animal prey), while anti-predator behaviour refers to certain agonistic behaviour of prey species. Agonistic behaviour is defined as "associated with aggression, including offensive, defensive, submissive, and fearful behavior" (Estes 1991: 559). Carnivores such as mongooses (Family Viverridae), hyenas (Family Hyaenidae), and jackals (Family Canidae) are all infrequently depicted in the art of the LSCA (*e.g.*, Eastwood *et al.* 1994; Eastwood & Cnoops 1998b; Eastwood & Blundell 1999). Felids, on the other hand, are a persistent and ubiquitous image in southern African rock art (*e.g.*, Lewis-Williams & Dowson 1989; Garlake 1995; Pager 1995) including the Northern Province of South Africa (Eastwood & Cnoops 1998b). In the Northern Province art none of the felids (lions and leopards), for example, show any significant or obvious behavioural characteristics, besides walking (*e.g.*, Fig. 5B). Despite this lack of painted or engraved variation, felines are significant in San cosmology. Lions, for example, were highly respected by Kalahari San and were

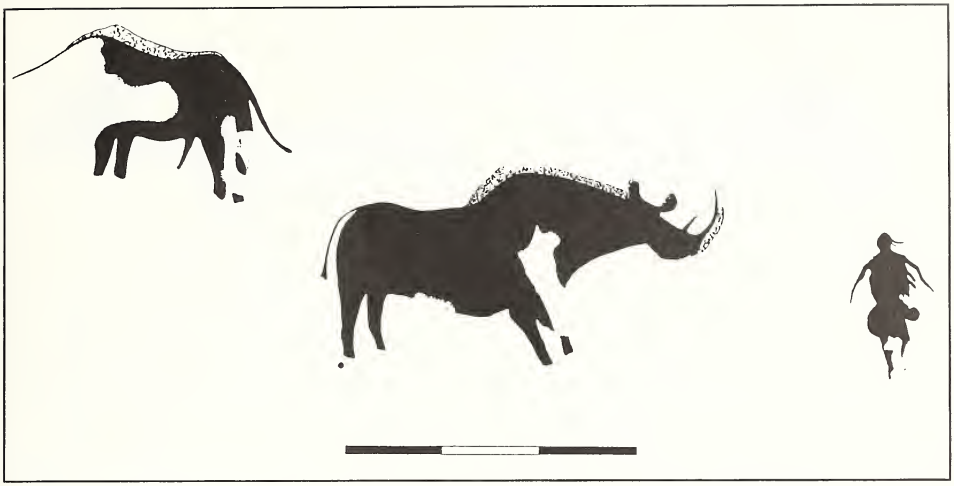

Fig. 7. An elephant bull in must, a black rhinoceros and an obese woman. Limpopo-Shashi confluence area, Zimbabwe. Black represents black, outlined stipple represents red. Black represents black, outlined stipple represents red. Scale in intervals of 100 mm.

believed to possess the same powers as shamans. Lions could, by all accounts, transform themselves into hartebeest, and when hunters appeared they could then revert to their lion form. It was believed that shamans were `Lions of God' who could change into lion form and move around the country in out-of-body travel (Lewis-Williams & Dowson 1989:132-133).

> Felines, like shamans, were believed to possess supernatural knowledge (Bleek & Lloyd 1911:187). The !Kung word for out-of-body travel, one of the shaman's activities, is *jum*, also the word for `pawed' creatures (Lewis-Williams 1981:97, 1985: 55). A common appellation for shaman is `beast of prey'; felines are obvious candidates for the visual representation of a shaman and their potentially dangerous qualities (Ouzman & Wadley 1997).

Predatory behaviour in animals and its analogues in San thought suggests that antidotal ritual behaviours such as shamanic trance (*cf.* Guenther 1975/6) has important implications for understanding anti-predatory behavior in expressive culture. Biesele, for example, has noted that the three main concepts of supernatural potency (*n/om*), altered states of consciousness (*!aia*), and the weather-changing capacities inherent in the interaction of certain animals and people (*n!ao*), and the related concepts of the powers that are found at the back of the neck (*n//ao* spot - from where sickness is expelled by shamans during the medicine dance, and where felines bite to kill), and *!kui g!oq* - danger from carnivores - are five concepts inherent in folklore. These five concepts she says "... help us understand Ju/'hoan ritual attitudes toward the problem areas of sickness, initiation, hunting, childbirth, weather, and attack by carnivores" (1993:88).

The anti-predator behaviour of animals includes gestures of alarm or alerting signals common in vocal displays among many mammals and birds. A panel of paintings from the LSCA (Fig. 5C) portrays a white rhinoceros and calf (*Ceratotherium simum*). This identification of the adult is based on five features: the pronounced shoulder hump, the very long anterior horn, the very short posterior horn, the exaggerated `square' lip, and the elongated head which is carried much lower than the shoulder hump. The calf also displays the typical head-lowered posture of this species, and the posterior horn has not yet developed. Usually calves precede their mothers when moving or in flight (Estes 1991:229), but in this panel the adult rhinoceros is painted in front of the calf facing a male lion, identifiable by its feline shape and mane (*cf.* Smithers 1983, fig 14). The unambiguous identification of the animal as a white rhinoceros, and the uncharacteristic position of the calf behind the mother is consonant with the white rhinoceros' anti-predator behaviour - the mother is confronting the lion and protecting its calf. The identification of the adult rhinoceros as female is clear from behavioural studies: the mother and calf separate from the dominant bull, the father, after the birth of the calf (P. Straughan pers. comm.) and it is mothers who zealously protect their young against attacks. Estes (1991:234) points out that young rhinoceroses are vulnerable to attacks by lions. These depictions clearly illustrate the anti-predator behaviour of the rhinoceros in the face of a potential threat by a predator. It should be noted that in this case parent/offspring behaviour is also exhibited. More

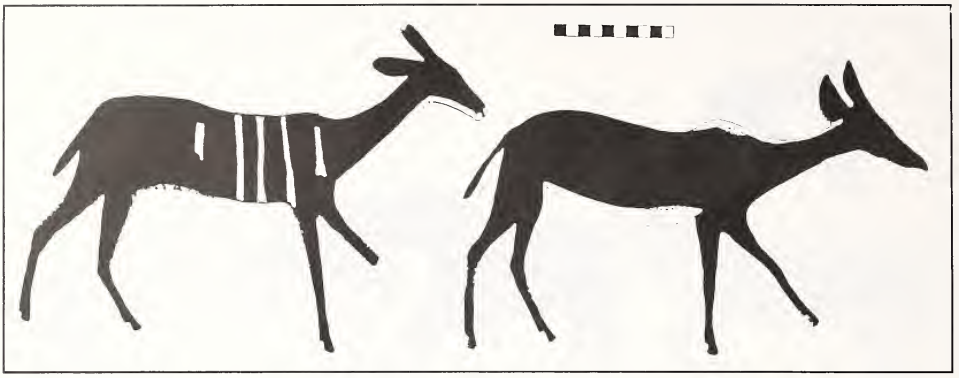

Fig. 8. Two kudu cows exhibiting typical pre-mating postures. Makgabeng plateau, South Africa. Black represents pink, white represents white. Scale in intervals of 10 mm.

importantly, given that felines embodied anti-social or threatening forces in San thought, it is possible then that this painting is commenting on the protective role of shamans towards their society (*cf.* Ouzman 1996), and it may make important statements about the role of feminine potency in San society. Later, we return to the very important issue of feminine potency in San rock art.

Behaviour in Death

This category of behaviour is not mentioned in standard reference works, but may be oblique in references to predators killing their prey. In the rock paintings of the south-eastern mountains of southern Africa, for example, images of eland are shown with their heads lowered, nasal bleeding, collapsing cross-legged, legs extended or defecating (*e.g.*, Lewis-Williams 1981; Lewis-Williams & Dowson 1989). Such postures are typical of animals dying from the effects of slow-acting toxins when shot with poison-tipped arrows and are not as a result of natural predation. Nasal bleeding and death postures in antelope are also metaphors for `death' in trance (*e.g.*, Katz 1982:115-116; Lewis-Williams & Dowson 1989:50-52). There are only three such examples in the Northern Province art as far as we can ascertain. One such example from the LSCA is illustrated in Figure 5D, where an indeterminate antelope has its head lowered and appears to bleed from the nose. In another example, to be discussed later, an antelope with its head lowered is interpreted as being in a near-death state as suggested by its contextual associations.

Social Behaviour

This is broadly defined as the social interaction of conspecifics, including communication - by visual, olfactory and vocal signals, territorial behaviour concerned with maintaining and advertising territory, and agonistic behaviour which is generally associated with aggression, fear and submission (Estes 1991:xxi). Agonistic behaviour overlaps with territoriality and mating behaviour.

There are several notable examples of animals exhibiting social behaviour in the LSCA San rock art. With their highly mobile and visibly prominent trunks, elephants (*Loxodonta africana*) use them in a range of revealing emotions and signals. For example, the trunk is an indicator of the animal's intentions in warning, threatening or charging a potentially threatening intruder (*e.g.*, Smithers 1983:538-539; Estes 1991:262-267). This expressive member is used in communicating, for example, benign signals such as the `greeting-intention movement' by extending its trunk out toward an approaching elephant (Estes 1991:262). This feature is evident in an image from the LSCA (Fig. 5E) and may have been intended to represent a greeting display.

An aspect of both territorial and agonistic behaviour is `cavorting' in the blue wildebeest (*Connochaetes taurinus)*. This behaviour combines many actions, such as leaping, bucking, spinning, jinking, head movements and tail lashing (Estes 1991:136). Such actions may have been intended in the painting of a wildebeest in Figure 5F, from the LSCA. This animal is clearly identifiable by its characteristically curved horns. When a wildebeest cavorts its head is sometimes lowered and its tail swishes outward.

Figure 5G illustrates two antelope from the LSCA. The antelope on the left which is difficult to identify from its horns, but appears to be a tragelaphine (Family Bovidae, Tribe Tragelaphini), such as a bushbuck (*Tragelaphus scriptus*), judging by the rounded form of the back. This identification is reinforced by the animal to its right which has the distal part of the horns canted slightly forward, which suggests that it represents a bushbuck. The animal on the left demonstrates the `head-low posture' - with the chin drawn in more or less depending on the direction of expected attack, and horns pointing upward - a nearly universal bovid characteristic of defensive threat. Alternatively, the right-hand animal displays the `medial-horn presentation', with the neck at about shoulder level with horns pointing upward, a feature of actions associated with offensive threat (Estes 1991:21). The two bushbuck may, alternatively be displaying anti-predator

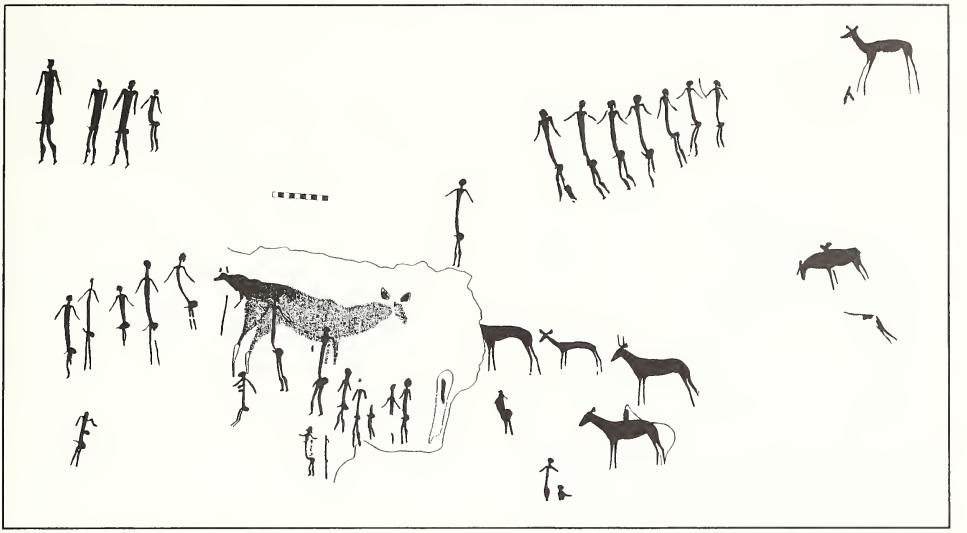

Fig. 9. A complex panel with kudu cow, impalas and humans. Limpopo-Shashi confluence area, South Africa. Black represents red, stipple represents yellow. Scale in intervals of 10 mm.

behaviour, although the context does not suggest this. Indeed, a bushbuck may face a domestic dog in this manner should flight prove difficult.

A subtle form of agonistic behaviour is displayed by kudu in certain situations and this posture is clearly depicted in the art. Kudu are a shy and retiring species, and when moving across open ground or approaching water they are hesitant and nervous, fleeing instantly if they sense danger. However, in woodland cover, they are less nervous and will stand still to observe the cause of disturbance. "Under these circumstances the large rounded ears, especially of the females, are a conspicuous feature, which when cocked toward the observer, appear to dwarf their heads" (Smithers 1983:668). This behavioural feature is especially notable when approaching kudu by vehicle, which may not necessarily pose an immediate threat. This attitude is displayed by the kudu cows in Figure 6 from the LSCA. These animals are identifiable as kudus by their shoulder humps, long necks and large ears. This painting is significant, because it is one of the few examples of polychrome kudu cows in this posture - usually cows are depicted with their heads lowered - a feature which we discuss below in more detail.

It is interesting that so many paintings in the study area exhibit behaviour associated with aggression, fear and submission. Indeed, returning to ethnographic analogues, Ouzman & Wadley have pointed out the distinction between latent and manifest threat particularly during San aggregation phases where `maverick' shamans may possess antisocial powers; "the danger from antisocial agents may remain latent if social norms are respected" (1997:394-395). Different animals showing attributes of anti-predator behaviour may therefore be a metaphor for protective deterrents against such forces.

Reproductive Behaviour

For the purposes of our study reproductive behaviour includes seasonality, sexual behaviour - which incorporates courtship and mating, and parental roles. Images of animal mothers and offspring are a widespread theme in the art of southern Africa (*e.g.* Pager 1975, 1993; Lewis-Williams & Dowson 1989; Lenssen-Erz 1994; Garlake 1995; Ouzman 1996). In the LSCA it is especially the giraffe which is depicted with young. Throughout southern Africa, San artists have persistently portrayed images and scenes which explicitly and implicitly depict the reproductive behaviour of animals. These images, of course, have a bearing on the way San people perceive things, and it appears that concepts such as analogues with social structure (*e.g.* Vinnicombe 1976), terri-toriality and long-distance travel (Ouzman 1995b), the health of the environment and social health (Lenssen-Erz 1994) and sexual behaviour are intended in the art. An example of such intention is an idiosyncratic depiction of an elephant from the LSCA (Fig. 7), which is associated with a black rhinoceros (*Diceros bicornis*) and a parti-cularly obese female figure. The identification of the rhinoceros is based on three features: first, the head is held erect up near the shoulders and is relatively short (in contrast to the white rhinoceros); secondly, the lip is rounded - not square as is the case in white rhinoceroses; thirdly, the animal has a generally slighter build than that of the white rhinoceros (Smithers 1983:558-563; Estes 1993:228-234; P. Straughan pers. comm.; *cf.* Fig. 5C). The male elephant has a large penis indicating the condition of must. In real

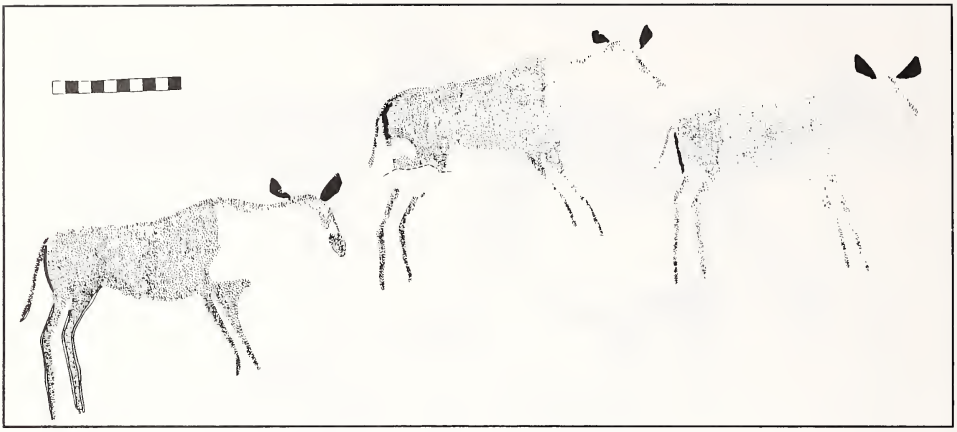

Fig. 10. Three kudu cows in pre-mating postures with their genital area emphasised. Limpopo-Shashi confluence area, South Africa. Black represents red, stipple represents yellow. The hind legs of the left-hand animal are outlined in white. Scale in intervals of 10 mm.

elephants this condition is associated with heightened aggression. These paintings have been interpreted by Eastwood (1999) as representing three powerful shamans. The red dorsal stripe on the elephant and rhinoceros represent rising potency and the obese woman is filled with potency. The tension between the sexual aggression of the male elephant and the woman are mediated by the sexually ambivalent rhinoceros standing for a shaman-healer by virtue of the emphasis on its *n//ao* spot - the area between the shoulders from where sickness is expelled by shamans. The rhinoceros' horn also has a thick red anterior stripe. Nuanced horns in rhinoceros engravings are suggested by Ouzman (1996:50) to metaphorically represent elements of both masculine and feminine gender ideologies-consonant with the confusing and inversive nature of altered states of consciousness where gender may be blurred. The red dorsal line and the anterior horn stripe appear to draw attention to areas of potency.

More subtle exhibitions of sexual behaviour are also depicted in the art. Take, for example, a set of paintings from the Makgabeng Plateau in the Northern Province, which depict two kudu cows (Fig. 8). These animals are identifiable as kudus because of their large ears, long necks, shoulder humps and white body stripes in the hindmost animal. They are females because they do not bear horns. Associated paintings consist of several indeterminate antelope and a warthog. Superficially, these images are simply two more female kudus, a widespread theme in the regional repertoire of painted animal subjects. Despite the aesthetic elegance of the paintings and the minute attention to detail in the execution of the paintings, this cluster of images apparently has little to suggest about the cosmology and beliefs of the painters - beside the fact that kudu are potent *n/om* and *n!ao* animals (*cf.* Marshall 1957; Lewis-Williams & Biesele 1978) - unless one takes into account the behavioural postures of the two animals. It will become clear as we proceed how the traits exhibited by these two kudu led us to look more closely at a this class of image, which in turn contributed to understanding the role of kudu, animals that lay at the heart of San cognitive thought in the Northern Province of South Africa and Zimbabwe in the past (Eastwood & Cnoops 1999).

Sexual and reproductive behaviour is not only evident in specific postures exhibited by certain animals in the art, but may also be apparent in portrayals of seasonal and territorial aggregation. In contrast to the two kudu cows mentioned above (Fig. 6), who have their heads held high and ears cocked, the two kudu cows in Figure 8 have their heads and necks extended forward in the `head low/chin out' posture, which may express submission in some bovids (agonistic behaviour), but in tragelaphine females it is a posture adopted by animals ready to mate (Estes 1991:171). One of the authors (Bristow), on identifying this typical pre-mating posture pointed out that the slightly raised tails and the significantly flattened ears of both animals are also features of female kudu in oestrus, and their willingness to be mounted by a male.

The examples that we have discussed so far point to the deeper, subtle and nuanced associations of images that may appear to be simply straightforward. Of course, this is not a new point and has been made by other researchers (*e.g.* Lewis-Williams 1981,1985). Nevertheless, ethology, combined with ethnography can produce insights into the art that it would be difficult to achieve with ethnography alone. We now turn our attention to a panel of paintings that illustrates this point.

Ethology and Ethnography

We now examine a large panel from the LSCA in South Africa (Fig. 9). This group of paintings depict four

groups of men, three of which are in processional rows. In the centre of the panel there is a large bichrome kudu cow with a single figure of a woman juxtaposed below its hind legs. Again, this animal is identified as a kudu because of its shoulder hump and large ears where the inner ear is emphasised in red pigment - a characteristic of polychrome depictions in the LSCA. This kudu cow, like the Makgabeng examples, has its head down and neck extended, again suggesting the typical mating posture of tragelaphines. To the right of the kudu are a group of four impala - the right hand top animal being a ram. At the top right of the panel is another impala ewe. These identifications of impala are based on the following: first, these antelope have a relatively slender build, especially the animal between the 'ram' and the headless animal and the antelope at top right of panel. Secondly, all these animals have long, slender legs (*cf.* Smithers 1983:647). Thirdly, they all have relatively large ears, and, fourthly, their backs are straight, rather than humped or rounded. Furthermore, way in which the two slender ewes were painted suggest that their lower bellies were once outlined in white pigment, a frequent feature of impala depictions in the LSCA. The horns of the ram are not accurate representations of impala horns, and appear to resemble those of a bushbuck. However, a bushbuck has a distinctly rounded back (*cf.* Fig. 5G). Furthermore, the frequent depiction of identifiable impala rams with groups of ewes in the LSCA reinforce this identification. The impala ram appears to be displaying the `proud posture' advertising territorial status (Estes 1991:158). Impala are seasonally territorial and during the rut a dominant male will herd a group of females, keeping competitors away by displays of dominance (*ibid.* 1991:159-161). The group of impala in the paintings are thus suggested as representing a breeding herd of females with a single alpha male.

Further to the right, a rather heavily-built antelope stands with its head lowered and a bifurcated object protruding from its back. Below it are the remains of a painting depicting a human figure in a bending-forward posture. This is identifiable as human because its knee reticulations are consonant with a human being's - not an animal's. The animal in the head-down posture suggests that it may be drinking, grazing or, alternately, may be in a near-death state. As we proceed with our discussion in the next section we identify its posture by examining the context of the whole panel.

We have now established that the central group of animals: a kudu cow, three impala ewes and an impala ram portray a specific posture associated with mating and seasonal breeding aggregation respectively. Interpretation of these behavioural attributes now depend, first, on understanding the meanings in the clusters of paintings surrounding the central group of animals, and secondly, linking the images to the ethnography.

We now examine a third component of this panel - the antelope at the right with a figure below it. This antelope has a protuberance painted on or out of its back. We suggest that this protuberance was painted to emphasise the *n//ao* spot, the point at which sickness is expelled by beings that have entered the `half-death' of trance (Katz 1982:115-116; Lewis-Williams & Dowson 1989:50-51). This, together with the head-lowered posture would suggest that this antelope is in a near-death posture and state. The human component of the panel, processional rows of men who appear to be acting in unison, clearly suggests ritual activity (*cf.* Parkington 1996:286; Eastwood 1999). None of the figures have bows in their hands, excluding the possibility of this being an economic activity like hunting. Secondly, in the topmost group at the right, the last man in the row carries a stick, or perhaps an arrow. Such a feature has been suggested by Eastwood (1999) to denote the control of potency in similar depictions of groups of men who are usually portrayed as carrying single, or sheaves of arrows , or batons in their hands. In this light the three processions of men can therefore be explained as representations of a medicine dance. Alternately, the rows of `men' may be explained as being a part of boys' initiation rituals. According to Schapera (1930:122-126) boys who have shown their hunting expertise are taken by 'magicians' to secluded places in the bush where they learn endurance and the mens' */gi* dance (cf. Silberbauer 1965:89 for description of G/wi initiation; Bleek 1928:23-25 for description of Nharon boys' initiation; and see Parkington *et al.* 1996 for interpretation of processional rows of men in the rock art of the Western Cape Province). In the !Kung tradition (Lewis-Williams 1981:60), after a boy has shot his first eland, he "is brought to the eland" where a ritual fire is kindled near the forelock of the dead animal. The new hunter's bow is placed at right angles to the `female fire stick' and the ash from this medicine fire is rubbed onto the bow in order to ensure future hunting success. A second fire is lit for cooking part of the liver and other parts, and then:

> ... the regular eland medicine dance is then danced. ... A medicine man who has eland *n/um* [*n/om*] goes into trance and `cures'. This dance is performed only by the hunters; no women are present. This is the only occasion on which men themselves do both dancing and clapping (Lewis-Williams 1981:60).

Unlike the two kudu illustrated in Figure 8, where the context does not *appear* to be relevant, the paintings in Figure 9 can only be understood if all the surviving components are taken into account. We argue that each cluster of associated images in this composition contributes toward understanding its meaning(s). Each cluster of images is inter-related, each reinforcing and supplementing the other, giving it a `semantic range'. This panel has been explained at length by Eastwood and Cnoops (1999) who interpret it in terms of *n/om* and *n!ao*. However, taking a slightly different approach, we now consider this panel in the light of the behavioural traits of the animals in the panel. First, the central, lone kudu cow has been indicated exhibiting a willingness to mate.

Secondly, the group of impala ewes are suggested as

being in pre- or post-oestrus states, and are therefore ready to mate, or, indeed, have completed mating. Below the hind legs of the kudu cow is a woman and 12 identifiable men. Already, we can begin by saying that this particular group of images is not a natural or literal `scene'. To begin with, a single kudu cow in oestrus would not be consorting with a breeding herd of impala, and it would be even more unlikely that these animals would be surrounded by humans. However, such a literal 'reading' does not bear closer scrutiny; the group of men and the single woman were painted in a later episode than the impala within the rock spall which had decapitated one of the impala, and the kudu was painted *over* two of the male figures and the indeterminate antelope - thus suggesting three possible painting episodes. However, despite the `cross-temporal' nature of this panel, the different components are linked - the spatial proximity of the kudu, impala and humans suggest conceptual proximity.

To elucidate this we now return to the ethnography. The larger antelope, in particular the kudu, is considered by the Kalahari San to be a particularly potent animal, a *n/om* animal whose potency may be harnessed by shamans to enter trance (Lewis-Williams & Biesele 1978). In addition this animal is believed to be a bearer of *n!ao*, a concept concerned with its weather-changing capacity (Marshall 1957). Nick Walker (1996:68) has also reported that kudu were used in the marriage rituals of Eastern Khoe San, the probable artists of the LSCA paintings. Eastwood & Cnoops (1999) have argued that the kudu was a central symbol in this region, and that women's initiation rituals centred on the kudu - a bearer of *n!ao*. The impala have been suggested as *n!ao* animals because they are also plains animals such as hartebeest and wildebeest and therefore suggest similar roles to those of the alcelaphine antelope in the *n!ao* beliefs (cf. Marshall 1957). Impala are not only grazers, but browsers as well, and are more resilient to drought than other plains animals. In Figure 9 the arrangement of impala as a group of females attended by a male suggest the mating of antelope prior to the expected rainy season, signifying the rejuvenation of the environment and the bearing of young.

If these rows of `men' represent boys' initiation ritual dances, the connection with the kudu, impala and girls' initiation and feminine potency makes even more sense. However, whether such rows of men are interpreted as the dual-gender medicine dance or male initiation dances, supernatural potency would have been generated in both cases - as the paintings suggest. The link between boys' and girls' initiation and the medicine dances are explained by Biesele as follows:

> Two other rituals involving dance and celebrating `production' and `reproduction', the boys' hunting initiation and the Eland Bull Dance for a girl at her first menstruation, have close connections to these main themes in the folklore and are also linked through them to the great curing dance (1993:81).

The paintings in Figure 9 are therefore suggested as making a gendered statement, where the kudu and impala stand for the women's concerns of initiation, readiness for marriage and childbearing (*n!ao*), and the men representing the male concern with initiation and the medicine dance. Thus the images of kudu cow and impala ewes represent women, who are conceptually interchangeable with prey animals (*cf.* Biesele 1993:89, 197). The men in this case are suggested as harnessing feminine potency.

In polychrome images of female kudu in the study area, most of them have their heads lowered and can be interpreted as representing women and the post-liminal stage of marriageability and readiness for childbearing. This explanation is reinforced by paintings of kudu cows in this posture where their genital areas are emphasised in red paint. This is not a literal characteristic of kudu - the feature however, is exaggerated and can only point to the use of animal metaphor in the paintings. During oestrus the vulva becomes slightly swollen and does have a reddish tinge (C. Guillaume pers. comm.). In the paintings and the red pigment frequently extends over a larger area (Fig. 10). Recognition of animal behaviour , we suggest, may thus alter the whole tenor of meanings that can be attributed to certain groups of paintings.

CONCLUSION

Although this paper has drawn on data from the Makgabeng plateau and the LSCA, the implications of the argument are wide-reaching, for throughout southern Africa there are animals painted in various postures and groupings. It is highly likely that the quantitative studies that have so far been conducted have overemphasised the category of indeterminate antelope; future studies of this kind could, perhaps, benefit from a more active, critically aware understanding of ethology. Primary identification by morphological attributes is essential in determining the taxonomic status of animals in rock art - and the ethnography may then offer clues as to whether San beliefs about animal `groupings' such as carnivores or alcelaphines and so forth correspond to more generalised paintings where species-specific features are blurred. If morphological identification fails, then ethology may give intimations of the taxonomic status of certain animals. Careful examination of animal images may thus reveal behavioural attributes that in turn could lead to deeper interpretation.

The identification of the pre-mating postures of the two female kudu from the Makgabeng Plateau, for example, did not immediately seem to impart any profound insights into the imagery. It was only after noting this posture in many paintings in the LSCA, that we began to recognise that this was an important theme, and that the context and associations of these animals opened up many possibilities for interpretation. Because a great deal of overarching theoretical work on southern African rock art has been done in the recent past intensive regional studies, with its differences in emphases, can provide a more detailed and

fine-grained quality of explanation. Images of kudu in a variety of contexts in the Makgabeng Plateau and LSCA substantiate the mating behaviour hypothesis - not only are their heads extended but in some cases their genital areas are emphasised in red pigment. This feature points to the importance of making a statement about the readiness to mate, a metaphor for a young woman's post-liminal status and her marriageability. This interpretation is corroborated by the association of a single kudu cow in the pre-mating posture with a seasonal breeding herd of impala, and with men performing a medicine or an initiation dance. These components point to the interlinked concepts of supernatural potency, the sexual potency of women and concepts concerned with metaphors linking women and prey animals.

Although rock art researchers do use ethology implicitly, it is only by explicit critical awareness that we can advance techniques like this. Indeed, just as ethnography has become an integral part of any interpretative approach to the art, so too should ethology. Certainly, if our aim is to get, as it were, as deep into the minds of the San artists as possible, then ethology is indispensable, for the San were, and still are, the ultimate ethologists. As Blurton Jones & Konner observed:

> ...!Kung have an advanced ability to observe and assemble facts about behavior and to discriminate facts from hearsay and interpretation. In this ability they surpass lay observers and many professionals in western society (1976:344).

In the absence of San people, however, rock art researchers could, perhaps, benefit from the observations of trained ethologists, zoologists, professional hunters and trackers - people who have close contact with wild animals on a daily basis. Developing our ability to understand animal behaviour can only make for a more productive interpretation of the art.

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A 300 YEAR-OLD LIVING FLOOR IN STRATHALAN CAVE A, MACLEAR DISTRICT, EASTERN CAPE

H. OPPERMAN

Department of Anthropology and Archaeology,
University of Fort Hare, Private Bag X1314,
Alice 5700

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ABSTRACT

The most recent living floor in the deposit of Strathalan Cave A consists of well preserved plant remains, including numerous bundles of underground plant food. Together with faunal remains, wooden and stone artefacts and pottery sherds an unusually complete picture of hunter-gatherer activities at the site, 300 years ago, is provided.

INTRODUCTION

The Strathalan site (30.59.22S; 28.23.19E) is located in the foothills of the Drakensberg range approximately 10 km northeast of Maclear in the Eastern Cape (Fig. 1). Cave A is one of three adjacent caves occurring in the sandstone wall of a large shelter. The site is significant because a sequence of well preserved living floors has been formed by many generations of Middle and Later Stone Age occupants carrying considerable quantities of plant and other cultural materials into two of the caves (Opperman 1992, 1996a & b; Opperman & Heydenrych 1992). Although the presence of botanical remains has been reported from Eastern Cape Later Stone Age sites (Deacon 1976; Binneman 1997) spatial distribution maps of cultural materials have not been drawn. In Cave A the material record of the last Stone Age occupants is thinly covered by soil, and this together with very dry conditions in the cave created ideal circumstances for studying cave space utilization and the distribution of cultural remains. During several fieldwork periods from 1994 to 1997 the layer of topsoil was removed and the cultural materials were left in position except for small samples of bone and plant materials which were taken for identification as well as dating purposes. This report describes the floor as it was seen after the excavation.

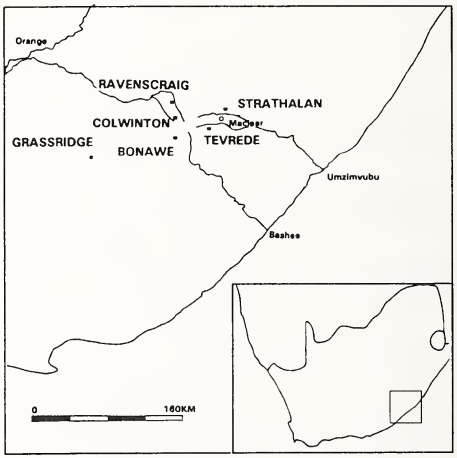

Fig. 1. Location of Strathalan and neighbouring sites.

THE DEPOSIT AND THE EXCAVATION

Cave A is 10 m wide at the entrance and 20 m deep. The deposit forms a mound towards the front of the cave. Approximately half of the midden at the entrance was removed as fertilizer in the 1930s. The remaining portion is still considerable and extends undisturbed towards the rear of the cave. The caves roof is very low, mostly 1 m or less, above the top of the deposit, limiting access to the back of the cave on the northern side (Fig. 2).

During the excavation, nineteen square metres of topsoil were removed to reveal the living floor (Fig. 3). At the top of the midden mound dried plant materials were so close to the surface that they were visible in places. Down the mound slope, towards the rear, the soil cover was somewhat deeper (50 mm) and contained considerable quantities of goat or sheep dung. In some instances, cultural materials were mixed with the dung.

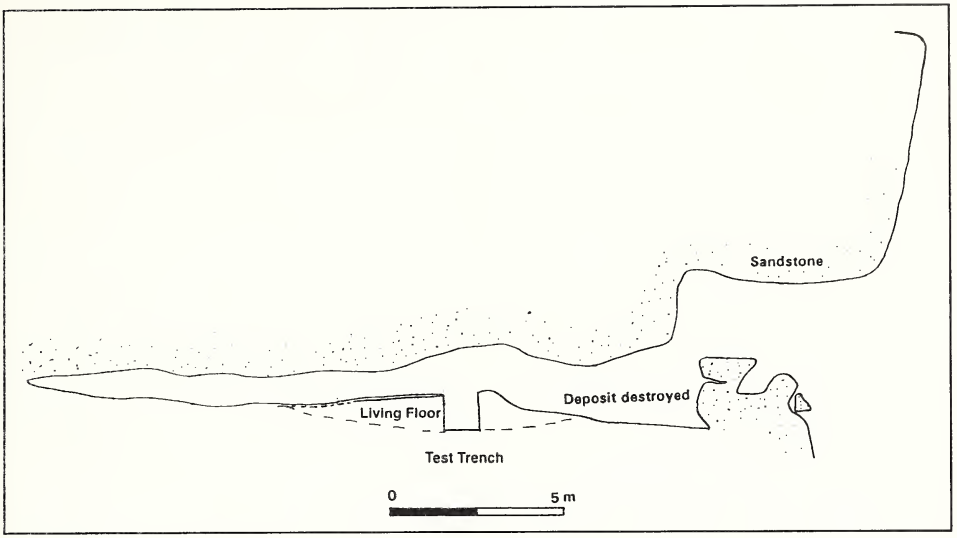

Fig. 2. Strathalan Cave A: section.

Recording was done by taking photographs of the visible materials drawing a map of the floor (Fig. 4). I believe that what is visible represents a single episode of occupation after which the band failed to return to the camp for some reason. It is expected that more remains will be revealed once the material is removed and the soil sifted. The floor is separated by sterile sand from a layer with earlier, equally well preserved occupation material dated to 2470 ± 900 BP (Pta-4634).

THE LIVING FLOOR AND ITS MATERIAL

The spread of cultural materials uncovered slants across the cave floor with fewer materials on the northern side (Fig. 4). Trampling can have a significant influence on the distribution of surface materials (Theunissen *et al.* 1998) and seeing that people and animals could only enter the rear of the cave along the northern side, loose materials would have been scuffed or dispersed out of the way.

Preservation of botanical and faunal remains is excellent and the distribution of these together with stone and wooden artefacts, pottery sherds as well as leather fragments offer an insight into activity patterning.

Plant food remains are predominantly *Watsonia* sp. and occur over most of the excavated area. Different methods were used by the gatherers (presumably women) to tie stems into small bundles for easier transportation. A popular technique was that of tying a number of stems into a single knot (Fig. 4:5, 8, 11, 20, 29, 44, 64, 66, 90). Another method was to twist a single stem around a bundle of stems (Fig. 4:19, 23, 28, 37, 43, 48, 65, 91). It is a possibility that each woman had her own preferred method. The techniques, however, do not appear to be localized except in the vicinity of a digging stick that was found in association with four bundles tied in the same way (Fig. 4:46). Plant food, with similarly tied stems, was found at Melkhoutboom (Deacon 1976). *Watsonia* sp. grows in the vicinity of the cave but dense stands can also be found within two hours walking distance. The flowering period for *Watsonia* sp. in the region is October to March, which would account for their edibility and also suggest when the cave was inhabited.

Of specific interest is the presence of sorghum heads indicating contact with agriculturalists (Fig. 4:42). Eight heads are localized in square X4 and one (Fig. 5) lies in square X2 (Fig. 4:76). One of the sorghum heads was dated to 300 ± 40 BP (Pta-7144). The stalks are all neatly cut but the sorghum is unused and it is possible that the occupants were not familiar with its preparation. Today farmers in the area plant sorghum in November and reap it in March to April. The particular band which was responsible for the living floor therefore possibly visited the cave in the late summer. The presence of calabash fragments, one of which has been repaired with sinew, is further evidence of contact with Iron Age farmers (Fig. 4:31, 78). It may be of significance that occupation of the cave was terminated at about the same time that agriculturalists appeared in the area. There is no record that hunter-gatherers used the cave thereafter.

Fourteen artefacts of wooden materials were spread over the excavated area. A complete wooden digging stick (430 mm long and maximum thickness 20 mm) (Fig.6) lies in a patch of underground plant food remains. The stick is pointed at both ends with one point somewhat flattened as if a hard object was struck during its use. The length is comparable to the lengths of three digging sticks found in

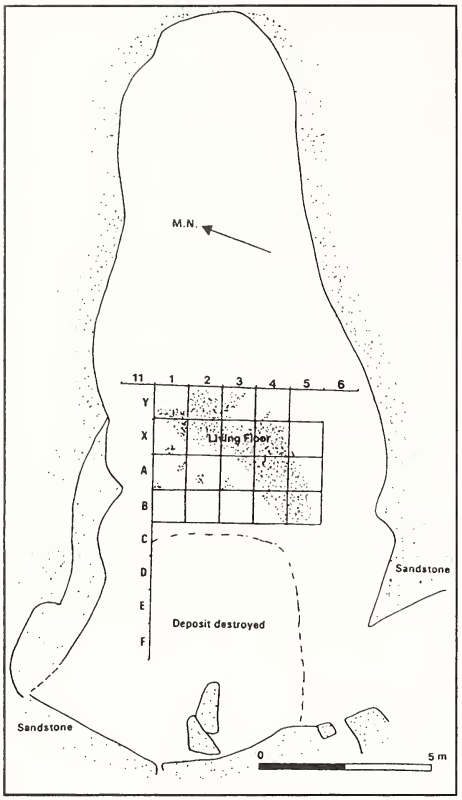

Fig. 3. Strathalan Cave A: map showing the location of the living floor.

layer 2 of the test trench dated to some 2500 years ago (Opperman 1996b). Finds of digging sticks have been recorded at Collingham Shelter (Mazel 1992) and Augussie Shelter (Binneman 1994).

Wooden pegs are short pointed implements of which four of which have been found (Fig.4:2, 12, 58, 73). Their lengths are 90, 150, 130 and 160 mm and maximum diameters are 15, 20, 13 and 15 mm respectively. The ends show evidence of crushing by blows. Similar wooden pegs were reported at Melkhoutboom (Deacon 1976). Figure 4:74 shows a sharp pointed fragment possibly of a spear (length 230 mm and maximum diameter 20 mm).

Slender artefacts somewhat similar in appearance to knitting needles formed part of the wooden toolkit (Fig.4: 50, 75, 83). Two of these are sharpened at both ends and are 200 and 170 mm long with maximum thickness being approximately 5 mm. The third one is 180 mm long and also has a maximum thickness of 5 mm. Figure 4:50a shows a wooden artefact 40 mm long which is similar in appearance to bone arrow points.

Somewhat enigmatic is a piece of reed (130 mm long), cut at both ends, with a hole drilled through one end through which a bone splinter was passed (Fig. 4:48).

Other artefacts made from organic materials are a piece of string from twisted plant fibres (200 mm long) (Fig. 4:35) and rings of twisted grass (Fig. 4:67). A small leather fragment was recovered in association with a calabash fragment (Fig. 4: 32). An ostrich eggshell bead was observed in square B5 but it is not shown on the distribution map.

Nine fragments of undecorated pottery occur, spread across the living floor (Fig. 4:1, 52, 56, 59, 69, 70, 77, 81, 101). Only twelve stone artefacts, including flakes and one core, were observed. It is possible that more are hidden amongst and underneath the plant materials.

Bone fragments are mostly concentrated in squares X4, Y4, X3 and Y3 where the cave roof is very low. A small sample of these was analysed by J. Brink and included *Procavia capensis* (dassie) (4), *Taurotragus oryx* (eland) (2), *Redunca fulvorufula* (mountain reedbuck) (3). *Alcelapus/connochaetes* (hartebeest/ wildebeest) (2), *Pelea capreolus* (grey rhebuck) (3), *Ourebia orebi* (oribi) (3), *Felis caracal* (caracal) (1) and *Lepus* sp (cape hare) (1). The hunters took game on the mountain range as well as on the plains at the foothills. The bulk of the meat came from the larger antelopes as was the case at other Holocene sites that have been investigated in the North-Eastern Cape.

DISCUSSION AND CONCLUSION

The excavated section of the youngest living floor in Strathalan Cave A gives a tantalizing picture of what the cave floor looked like 300 years ago when a hunter-gatherer band camped there during late summer. Abundant quantities of underground plant food and game were carried into the cave showing that sufficient resources were available for subsistence. Some patterning of the material can be observed, although the hearth area has been destroyed, which is usually a focus for family activities at a camp. Apart from excavating the material further towards the back of the cave, the greater pattern, of which the visible living floor is part, remains obscure. It is further possible that the observed distribution of remains is in part influenced by the low height of the cave roof having channelled movement to one side. The living floor of matted dried plant materials with artefacts in between, nevertheless supplies information which is rarely found at Stone Age sites in the Eastern Cape.

Two different techniques were used for binding bundles of underground plant food which were carried to the cave. This could indicate the presence of at least two women in the band. The digging stick found may then have belonged to one of them. The role of plant food in the diet of hunter-gatherers is important (Deacon 1993) but the contribution of some 17 bundles and a lesser quantity of loose patches of plant food seems to be considerably less than the meat input of eleven antelope including two eland.

Fig. 4. Strathalan Cave A: the living floor.

The presence of sorghum and calabash fragments in the living floor is the first evidence that Nguni farmers were present in the Maclear district before the nineteenth century. It is not known were they were located but the owner of the farm testified that grain pits were ploughed over in the valley below the cave at the beginning of this century (A. Macdonald pers. comm.). The proximity of a farming community could explain why the cave was not revisited by the San bands that were present in East Griqualand until the middle of the eighteenth century (Wright 1971).

The environmental setting of Strathalan is such that hunters located there could have hunted grassland game on the plains as well as mountain game species. A hunting pattern in which larger antelopes contributed the bulk of the meat is in accordance with the pattern observed at other North-Eastern Cape sites (Opperman 1987). In the light of this observation, the viewpoint based on data from a test excavation, that trathalans was used as a plant food processing camp, with smaller antelope occasionally hunted, is not valid for the situation 300 years ago (Opperman 1996b).

The artefacts, including wooden ones, give a more comprehensive record of a San toolkit at that time than has been found at other sites in the region. The scarcity of stone artefacts observed, especially scrapers, is surprising. Quantification of stone artefacts, however, will only be possible after the floor has been removed and the soil sifted.

Comparing this Later Stone Age living floor with the Middle Stone Age living floors (dated to between 29 000 to 22 000 years ago) in adjacent Cave B (Opperman 1996a, Opperman & Heydenrych 1990) striking differences are noted. The Middle Stone Age people, living under glacial conditions, had much poorer food resources at their disposal and the floors were composed of grass patches, hearths, bone fragments, stone artefacts, leaves, twigs and very low quantities of underground plant food. The technology for stone artefact manufacturing was different and little use was made of wooden materials for the manufacturing of tools.

Although this 300 year old living floor apparently does not represent an intensive occupation over a long period of time, it does give a much more comprehensive picture of the past than the burned out and compressed occupation layers which archaeologists usually excavate. It has the potential, together with information from older living floors in the deposit, to supply data for explanations which

Fig. 5. Strathalan Cave A: a sorghum head in association with a calabash fragment, a bundle of plant food stems tied into a single knot and bone fragments.

Fig. 6. Strathalan Cave A: a complete digging stick in association with plant food remains.

can lead to a better understanding of the way in which Stone Age people lived in the region.

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OBSERVATIONS ON THE MANUFACTURE OF SOAPSTONE PIPES IN NAMAQUALAND, SOUTH AFRICA*

LITA WEBLEY

Albany Museum, Somerset Street, Grahamstown, 6139

email: L.Webley@ru.ac.za

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ABSTRACT

This paper describes a technique of manufacturing soapstone smoking pipes in Namaqualand and supports the view that this industry post-dates the introduction of European manufactured metal artefacts to the sub-continent. Two pipe forms are recognized and some comments are made on their origins and possible gender associations. The distribution of these pipes may inform on post-colonial trading systems in the Northern Cape and Namibia.

INTRODUCTION

Fragments of stone pipes have been recognised from a number of archaeological sites, *e.g.* in the Brandberg (Rudner 1957, Jacobson & Peisach 1982), the central Namib desert (Kinahan 1986), Gordonia in the Northern Cape (Rudner 1971) and at Highlands in the Eastern Cape (Deacon 1976). There are ethnographic collections of soapstone pipes in the South African Museum, (Rudner 1971, Shaw 1938), the McGregor Museum as well as in the Albany Museum. The origin of this industry has not been dated but by historic times both the Nama-speaking Khoekhoen and the Dama of Namibia are reported to have been manufacturing stone pipes (Jacobson & Peisach 1982; Rudner 1971).

The name *Kodas* (or *!kho-/ui-s*) which forms part of many place names in Namaqualand and Namibia refers, according to Nienaber & Raper (1977), to the serpentine stone or soapstone used by the Khoekhoen to manufacture their pipes (*!khodi*). There is place by the name of Kodas, some five kilometres north of the Numees copper mine in the Richtersveld, which was reported by Laidler (1927:149) to have been used by the Nama-speaking Khoekhoen for pipe making.

HISTORICAL ACCOUNTS

Dutch clay pipes were introduced to Namaqualand as early as 1661 when Pieter van Meerhoff recorded the following meeting with a Namaqua chief: "I gave each of them a clean pipe of tobacco; they were anxious enough to smoke, but most of them could not; the king, instead of drawing in his breath, blew from him; I took his pipe four or five times, and showed him that he must draw in his breath; he began to learn; and they all learned so well while we were with them, women and well as men, that they began to be very fond of tobacco" (Moodie 1960: 232). From this passage it is clear that Van Meerhoff was responsible for introducing the clay-type pipe to the Little Namaqua Khoekhoen and the implication seems to be that he also taught them how to smoke tobacco.

Historical accounts suggest that it was the Nama-speaking Khoekhoen (referred to in the literature as the Namaqua) and the Korana of the Orange River who were primarily responsible for manufacturing soapstone pipes. According to Alexander (1967 Vol 1:99) who travelled through the region in 1838: "The pipes of these Namaquas were composed of green serpentine from the Kamiesberg and were straight tubes three or four inches long, narrowing at the mouth piece, and not broader at the other end than to permit their insertion into the common brass tinder box". Further, he relates, "These pipes were neatly turned and ornamented with a little carving"

When Cornell (1985:101-102) travelled through the Richtersveld in the 1920's he observed "men, women, and quite small children passing from mouth to mouth the native-made soapstone pipes, filled with their loved tabaki. These pipes are peculiarly shaped, being a straight tube like a very large cigar-holder, and often the more primitive natives simply use the hollow shin-bone of buck or sheep".

With respect to another Khoekhoen group, namely the Korana, Somerville who traveled through their territory in

1802 remarked; "they make tobacco pipes of a stone called Prehnite (hydrous silicate of calcium and aluminum) which is brought from the Namaqua Land, and of a kind of ochery red stone soft enough to bear being cut and scraped. Their pipes are straight - about four inches long, small at the extremity put in the mouth and extending to nearly an inch at the other end. They exchange tobacco from the Briquas" (Bradlow1979:94).

The `Bushmen', on the other hand, (Engelbrecht 1936) had pipes called *!heis,* which were made of the bones of springbuck or wild dog. Some of these pipes were ornamented with dots. They are reported to have smoked strong tobacco mixed with pipe-oil and soon became `intoxicated'. Several of Engelbrecht's informants agreed that pipes of stone were originally obtained from the Koranna. In addition to also being part of the material culture the San, historical accounts suggest that the Herero and Tswana (Rudner 1971; Shaw 1938) also used stone pipes but it is not clear whether they manufactured the pipes or obtained them through trade with the Nama-speaking Khoekhoen or the Korana.

Rudner (1971) and Deacon (1984) have suggested that this industry post-dates the introduction of metal to South Africa and Kinahan (1986) has also stated that all the stone pipes from the central Namib desert shows signs of metal working.

THE MANUFACTURING PROCESS

While undertaking ethnographic research among semi-sedentary pastoralist groups in three Rural Areas in Namaqualand, the author observed the manufacture of soapstone pipes. A resident of the Steinkopf Rural Area, Mr C and his son E, are reported to be the last craftsmen in Namaqualand who still practice this trade. Their reputation has spread as far afield as the Richtersveld on the Orange River and Leliefontein in the Kamiesberg, and they are regularly visited by people with requests for soapstone pipes, ash trays, cups and saucers, teapots and candle holders.

Mr C was contacted and interviewed in August 1986. He had not visited a stone quarry for some time but was persuaded to use a piece of soapstone in his yard. He generally collected his stone from two sources, i.e. Uitkyk (a distance of 30 km) and !Kosis (40 km). Both are sources of blue/grey stone. Mr C was aware of other localities of green soapstone in the vicinity of the town of O'Kiep (30 km). In addition he recalled seeing fragments of pink soapstone around Geselskapbank (45 km), a site formerly reputed to have been occupied by San groups.

Mr C described to me that the stone is quarried by boring holes into the soapstone outcrops using a hand-drill. Long iron bars (called *kuile*) are inserted into the holes and struck at right angles with a hammer until roughly rectangular blocks are broken out of the bedrock. A large amount of stone is collected and transported by donkey cart or truck to his house where the processing takes place. The pipes are made by Mr C and his son with the latter doing most of the hard work. E saws a rudimentary pipe shape out of the stone using a metal hand-saw (Fig. 1). He then uses a hand-drill to bore a hole into the bowl of the pipe (Fig. 2). Mr C refines the shape of the pipe using a rat-tail file to produce a rounded shape (Fig. 3). Afterward he uses a home-made drill to drill a hole into the pipe stem (Fig. 4). The final touches are added with water and sand-paper to produce a glossy finish and E uses his penknife to decorate the bowl of one of the pipes with a cross-hatching design. The two pipes (Fig 5) took two hours to complete.

EXPLANATION OF THE PIPES

Mr C described the `cigar-shaped' on the left (Fig. 5) as a `Bushman' pipe. It was, he said, formerly made from the shin bone of animals. The pipe with the bowl and spur (similar to the clay pipe introduced by the Dutch) on the other hand, he said, is always smoked by Nama women. It appears that Mr C acquired this information, together with the craft of stone pipe-making, from the late Dirk Oorlam during the 1940's. Dirk worked on the roads in the Northern Cape and made stone pipes in his spare time for sixpence a piece. Mr C recalled that Dirk Oorlam used a bowdrill or cotton reel and bow, strung with a thong (*riem*), to drill the hole in the pipe bowls. He also used a home-made awl made of a length of fence wire fitted into a wooden handle.

ETHNOGRAPHIC NOTES ON THE USE OF SOAPSTONE PIPES

Informants from the Leliefontein and Steinkopf Rural Areas all agreed that they had obtained their stone pipes from the Steinkopf/Concordia area, north of the town of Springbok. Although they recognise both pipe forms only the bowl-shaped type is commonly found in both the Leliefontein and Steinkopf Rural Areas. According to informants from these areas, the very old, weak women (*oumaka*) smoked the straight pipe, which is variously called the *!ko* or *!kanoes* (my spelling) pipe. The bowl-shaped pipe, called the `*klip-pyp*' was smoked by the women `who could still walk around'. Today many elderly women in both areas own the bowl-shaped type (Fig. 6). Most retain their pipes only for sentimental reasons as they have inherited them from mothers and grandmothers. One informant of 84, however, still smokes `*boer twak*' in her pipe on a regular basis (Fig. 7).

Information from the Nama-speaking communities in the Richtersveld indicated that soapstone for making pipes was obtained from the Helsberg area. Only three elderly males reported that they were still able to make stone pipes in1997, but when approached they said they would need the proper equipment and transport to the soapstone quarries and they were not sure if they could still remember the process. Female informants said that the pipes had been manufactured by their fathers, but that they had been used by the women - generally the older women. An elderly female informant, who had undergone the female initiation ceremony in the 1950's, told me that

Fig. 1. E uses a saw to produce the rough shape of the pipe

Fig. 2. The bowl of the pipe is made with a hand drill.

the bowl-shaped pipe (called the `*agterkop pyp*' or the `*vroumens pyp*' in Afrikaans) was definitely smoked by the `*groot vrouens*' or elderly and respected women.

In Nama (spelling verified by Nama-speaking informant), these pipes are called:

!noro-!kos (bowl-shaped type)
≠go-!kob (cigar-shaped pipe).

Fig. 3. Mr C. shapes the pipe using a rat-tail file.

Fig. 4.The hole in the pipestem is made with a home made awl.

According to these informants, men did not smoke the stone pipes but used the fore limb of the goat instead. While there seems to be some confusion, especially among the younger generation, the majority of those questioned in Leliefontein, Steinkopf and the Richtersveld emphasised that it was the women who used the bowl-shaped pipes. This does not mean that men went straight from the bone pipe to the shop-bought wooden pipes, but it does suggest that it is women, rather than men, who are traditionally associated with stone pipes.

DISCUSSION & CONCLUSIONS

Two stone pipe types have been recognised archaeologically and ethnographically from the Northern Cape and Namibia. It appears likely that the cigar-shaped pipe has its origin in the earlier bone pipes made from the shin

Fig. 5. The complete pipes. The cigar-shaped pipe is on the left and the bowl-shaped type on the right.

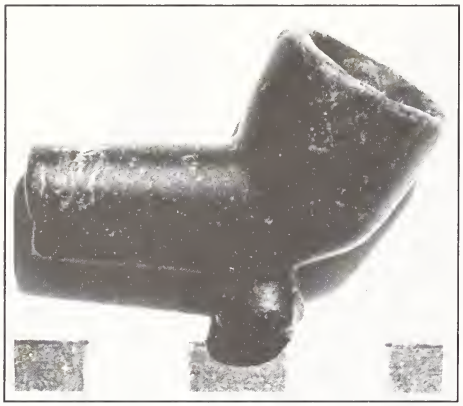

Fig. 6. An old stone pipe owned by one of my informants.

bones of small ungulates (Rudner 1971). The bowl-shaped type, however, is a copy of the Dutch clay pipes in use at the Cape during the 17th and 18th centuries. It has been suggested (J. Deetz pers. comm.) that a careful study of a large collection of these soapstone pipes, including the shape and angle of the bowl, may enable the approximate date of this cultural borrowing to be determined.

After having witnessed the manufacture of soapstone pipes, I am of the opinion that they may only be produced with metal artefacts. It is clearly possible, however, that bone pipes may have a longer history and may have been used for smoking dagga or *Cannabis sativa* (Elphick 1985; Shaw 1938).

The hatching around the rim of the bowl-shaped pipes closely resembles the zigzag and check designs which decorate the rims of wooden milk vessels (*bambus*) found amongst the Nama and Korana during the 19th and 20th centuries in the Northern Cape. It has been argued elsewhere (Webley 1997), that these designs (hatching, zigzags, parallel and diagonal lines) are overt male symbols applied by men to certain items of material culture in order to reassert their authority over their womenfolk. As with the *bambus*, it was necessary to have metal implements to manufacture the stone pipes and men used this opportunity to exercise their control over activities (in this case smoking) mainly enjoyed by women. That pipe-making is a peculiarly male activity is supported by Lau (1987) who has noted that by the 1850's men in southern Namibia were still making the wooden milk bowls and the pipes of soapstone.

Fig. 7. A few of the pipes are still in regular use.

Both pipe types have been associated with a number of groups including the Khoekhoen, San, Dama, and Tswana stretching geographically from the Western Cape to Namibia and inland along the Orange River as far as the Vaal-Orange confluence. If more data can be collected on the distribution of soapstone pipes and a sourcing of the raw material is undertaken, we may be able to make important inferences about the trading links in the north-western part of South Africa after the introduction of metal.

ACKNOWLEDGEMENTS

This paper is based on fieldwork undertaken in 1983 (with the financial assistance of the CSD) and 1997, however the views expressed remain those of the author. I would like to thank Mr C and E of Steinkopf for their help in making this paper possible. I am also grateful to Jill Gordon, previously of the Richtersveld National Park, who facilitated a Heritage Training Programme in the Park in 1997 during which further observations were made on stone pipes.

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GEOGRAPHICAL INFORMATION SYSTEMS APPLIED TO MARITIME ARCHAEOLOGY, WITH SPECIFIC REFERENCE TO THE TABLE BAY PROJECT*

COLIN G.C. MARTIN & BRUNO E.J.S WERZ

The Southern African Institute of Maritime Archaeology,
P.O. Box 2505, Durbanville 7551

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ABSTRACT

Geographical Informations Systems or GIS are valuable tools for the recording, management and analyses of data. Although their worth has been proven extensively in such fields as town planning, natural and cultural resource management, relatively few contributions have been made to archaeology to date, and even less so to the specialisation of maritime archaeology (Kvamme 1989; Wansleeben, 1988; Allen, Green & Zubrow 1990; Allen, Gardiner, Fontana & Pearson 1993; Murphy 1993). This article describes the design of a specific GIS database for the Maritime Archaeological Project of Table Bay (MAP), as designed in the mid-1990s, which will be further developed in the future. Very recent developments, such as the introduction of the World Geodetic System (WGS 84) and multi-beam sounding techniques for underwater surveys in South Africa will further enhance this project.

INTRODUCTION

Since 1989, the second author of this article has been focusing on the maritime history and archaeology of the greater Table Bay area. Historically, this bay has seen intense shipping traffic since the seventeenth century due to its geographical position, roughly halfway between Europe and Asia. Because of its importance as a place of refuge and port-of-call for vessels in the southern oceans, as well as being a major repository for historical shipwrecks originating from many different nations, a detailed study of Table Bay and its archaeological poten-tial can contribute considerably to international maritime studies (Breitenmoser 1991; McLachlan 1991; Durden 1992; Werz 1992a; 1993c:237-238; Werz & Martin 1994:3-7; Sharfman 1998; Werz 1999:67; Mavrodinov 1999).

The Maritime Archaeology Project focusing on Table Bay is complex and multi-faceted and attempts to answer a variety of research questions. As a result of this holistic approach, which includes contributions from archaeologists, hydrographers, oceanographers, surveyors and geologists, the objectives of the Maritime Archaeological Project (MAP) have been formulated as follows:

a. to study the geographical, oceanographical, geological and meteorological characteristics of the Table Bay area and any changes which might have occurred in the course of time;

b. to provide an inventory and explain shipping movements and trends based on documentary evidence until 1900;

c. to itemise the archaeological potential of Table Bay, with an emphasis on shipwrecks and harbour constructions; and

d. to undertake detailed surveys of specific archaeological sites situated in the bay and on its shores;

e. to collate and integrate data obtained via the above-mentioned approaches in order to explain the formation and deposition of identified archaeological sites (Werz & Martin 1994:3-4; Werz, 1999: 67).

It was appreciated in the planning of the project that a Geographical Information System (GIS) would be a valuable tool for the record, management and analysis of the variety of data collected by different researchers. This system was developed by surveyors who are also involved in archaeological fieldwork for defining the positions of located sites and associated artefacts, as well as providing survey control based on the national grid system so that the position of each artefact may be defined by a three-dimensional coordinate (Breitenmoser 1991). In this context, such a coordinate is a key element from which the GIS is developed.

Although the project is still being developed further, enough experiences have already been gained to be able to provide this interim report on progress made thus far.

BASIC CONCEPT OF A GEOGRAPHICAL INFORMATION SYSTEM

Surveying essentially deals with determining positions in space. Within the context of archaeological work, surveying techniques are used to visualize the object of survey, usually a part of the earth's surface, and artefacts or features contained therein. Measurements taken from the survey control to these items can assist in indicating their spatial relationships and the results are normally depicted on a traditional paper map or plan. However, such maps have three major limitations:

1. the physical extent of the paper restricts the amount of detail that can be shown;

2. the scale of the map is predetermined by the maker and the user can only 'zoom' into an area by consulting another map drawn at a larger scale; and

3. there is much non-spatial information recordable in tabular form which can not be depicted on a map.

During the last three decades, these shortcomings were partly counteracted by developing computer technology which allowed for the creation of statistical packages and spreadsheets, and to facilitate computer-assisted draughting (CAD), being both graphical and spatial but with a limited application. A Geographical Information System is the amalgamation of the two, allowing statistical data to be linked to a spatial identity. This facilitates enquiry concerning spatial relationships and helps towards sensible decision making. A GIS is not simply a map producer, but more of an analysis tool. The basic questions expected to be asked of a GIS include those of the following:

- location (What is at...?)
- condition (Where is it?)
- trends (What has changed since...?)
- patterns (What spatial patterns exist?)
- modelling (What if...?)

Planning the database and anticipating the type of enquiry are all-important elements when designing a GIS and cognizance must be taken of the real world which consists of many elements or layers of related data, e.g. relief, rivers, roads, soils, etc. In this article, such layers are called 'coverages'. Different data sets which are entered into the system must be linked so that they match (*e.g.* rivers should flow under road bridges); a hierarchical structure can be recognised (*e.g.* roads may be classified as motorways, secondary roads, tracks, *etc*); and a tolerance must be adopted to accommodate different levels of accuracy of the original measurement at time of survey. In short, space and the position of features within this space are the common factors for which a coordinate system on the earth's surface is required and this must be understood by the computer after transformation to its built-in coordinate system. Then the concepts of coverages in graphics and overlays for analysis may be pursued.

There are three basic elements in the graphics of a GIS: points, arcs and polygons. To illustrate these, two polygons (I and II) are shown in Figure 1, having arc elements (A to E) where each arc has points as terminals (21 to 24).

The non-spatial tabulated data may be called up by identifying that element to which the data refers, e.g. what is the traffic density and when was the last date of repair of the road depicted as arc A ? The more sophisticated GIS packages allow for the overlay of tables as well as the graphic coverages, where the principles of Boolean logic apply, so that new tables may be automatically constructed for those identities formed by intersection or union. Diagrammatically, these identities are shown in Figure 2.

The above is a very brief description of the principles of a GIS which can be used by anyone who works in a spatial environment, an archaeologist being one. The second author, being a maritime archaeologist, took advantage of GIS in 1990 to enhance his study. The software package obtained was ARC/INFO and terminology used in this paper will be with reference to this system (ESRI, 1990).

DESIGN OF THE GIS DATABASE FOR TABLE BAY

Table Bay, which has an approximate surface area of 20 square miles, is the repository of more than 350 shipwrecks and also contains the remains of harbour works and anchorage debris (Werz 1999:67, 70-76). Given this potential, it is likely that more archaeological work will be undertaken during the next few years. Therefore, in anticipation of this, the GIS should facilitate uniformity in the database covering wrecks and other maritime sites, simplicity in file and directory management and accessibility of any area in the bay, thus avoiding a multiplicity of such systems. Also, although the major users will be maritime archaeologists, much more useful data can be incorporated by using GIS so that geologists, oceanographers, biologists and others can benefit. Thus, in addition to an inventory of shipwrecks and artefacts, the database has been designed to offer a statistical analysis technique for surface-, intermediate- and bottom-currents, as well as presenting wind data, sediment distribution and an analysis of the bathymetry using digital elevation modelling. It is expected that by planning the GIS for Table Bay with these possible applications in mind, one of the most obvious pitfalls of many in their early working with GIS, namely to rush into the storage of data without proper planning, has been avoided.

When designing the above-mentioned components for a database, the underlying goals were to maintain consistency, reduce redundancy and maintain user- flexibility,

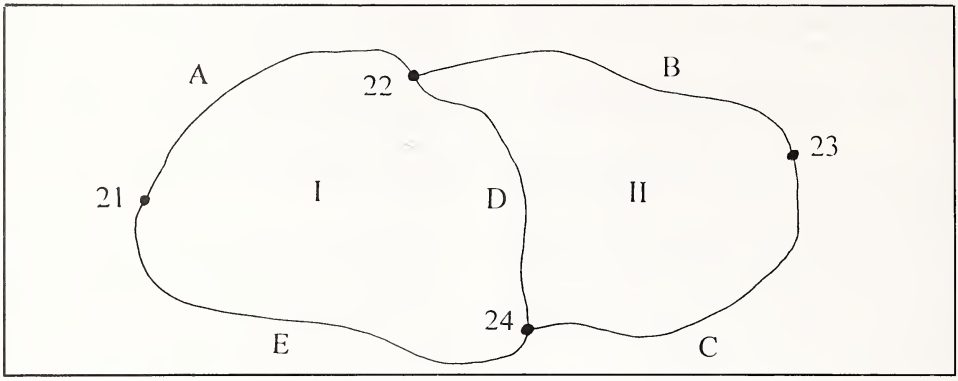

Fig. 1. The three basic graphic elements of a GIS : points (nodes), arcs (lines) and polygons.

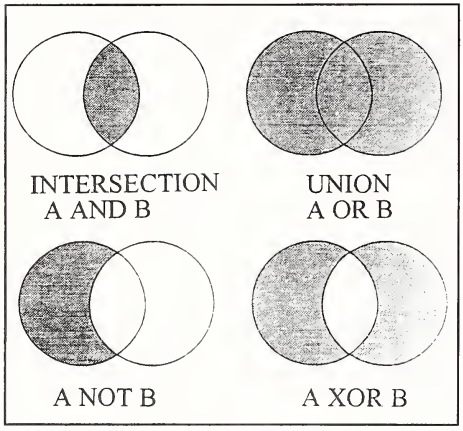

Fig. 2. Boolean operators, whereby OXR means `A exclusively or B' (after Dickson, 1904:4).

bearing in mind the variety of queries to be asked of the database, such enquiries involving both spatial and attribute (*i.e.* tabulated) criteria (Chambers, 1989:2). The conceptual view of the database is shown in Figure 3, where certain groups of coverages which comprise the base map, the environment and shipwrecks are depicted. Also shown are the forms of the spatial entities, *i.e.* whether points, lines (*i.e.* arcs) or polygons, which are the basic elements of any GIS. Individual coverages of the GIS for Table Bay will be described in more detail hereafter.

The base map has three coverages, the first being geodetic control. This coverage was created by entering the coordinates of trigonometrical beacons and other physical survey control points on land. These coordinates were provided by the South African national survey authority. On the graphics screen, these are symbolised by a triangle with an identity number alongside. An example of this, representing trigonometrical control beacon 265, can be seen in Figure 4. When queried, the numerical values of the coordinates to one or two decimal places can be displayed on the screen in tabulated form. These represent the non-spatial attributes of these point entities.

The geodetic grid lines form the second coverage. These may be depicted as complete lines (Fig. 4) or suppressed and replaced by intersection crosses only (Fig. 5). In both instances, the values at the chosen interval are displayed around the perimeter of the map.

The third coverage of the base map, topography, shows the coastline and detail of some features on land. In most cases these are arc entities, but where arcs fully enclose an area, such as the coastline of an island or the outline of a building, then these become polygon entities. This coverage was created by digitizing the detail shown on existing maps and charts.

The coverages of the environment database are included in order to enable archaeologists to analyse those factors which possibly influenced archaeological site formation and deposition, and to anticipate the dispersal of associated artefacts. To date, four such coverages have been incorporated or planned in the GIS, prevailing winds and the bathymetry being the most substantial. A coverage for current data has been established while that for sediment deposits has yet to be included. Where created, these have feature attribute tables attached.

Wind data were provided by the Electricity Supply Commission (ESCOM) for the six-year period 1985-90. These were categorized into ten groups of wind velocities. For the GIS and the production of wind roses, these were generalized into three categories: less than 4 m per second, 4 to 8 m per second and more than 8 m per second. The ARC/INFO software has a 'simple macro language' and a program using this was written for construction of the wind roses (Fig. 6).

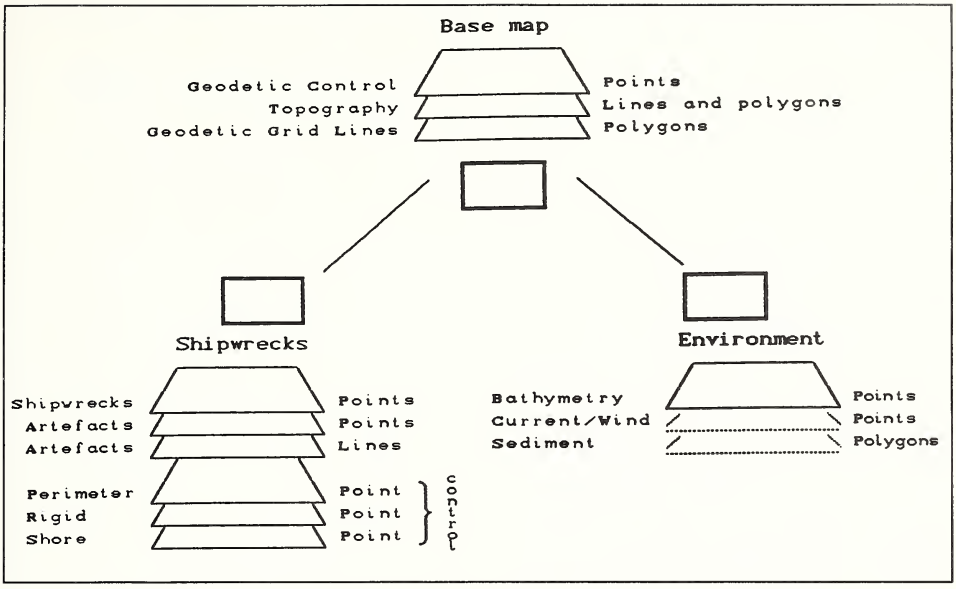

Fig. 3. Conceptual view of the database for wrecks (after Chambers, 1989).

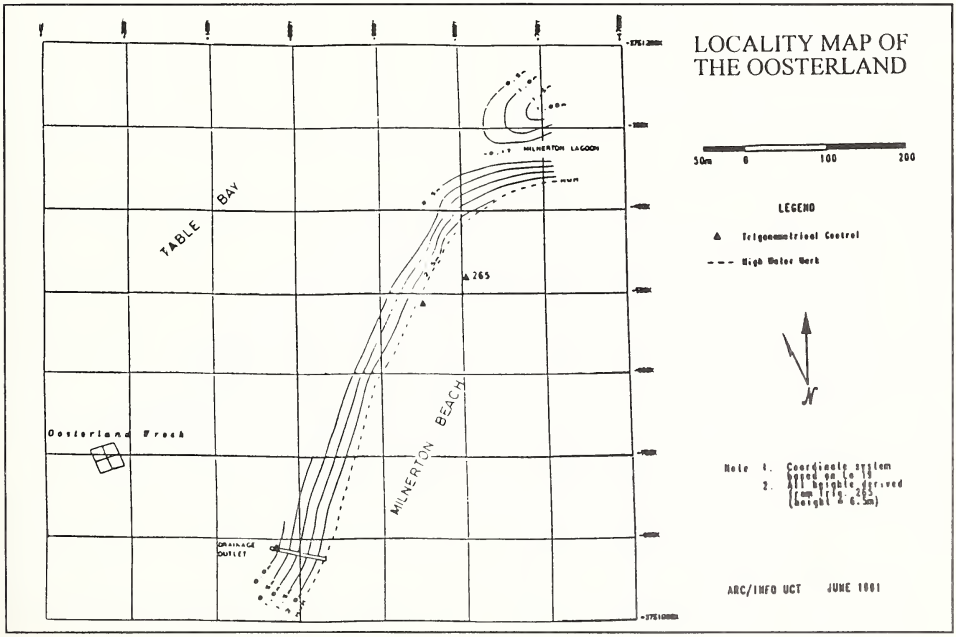

Fig. 4. Locality map of the *Oosterland* (Breitenmoser, 1991: appendix G).

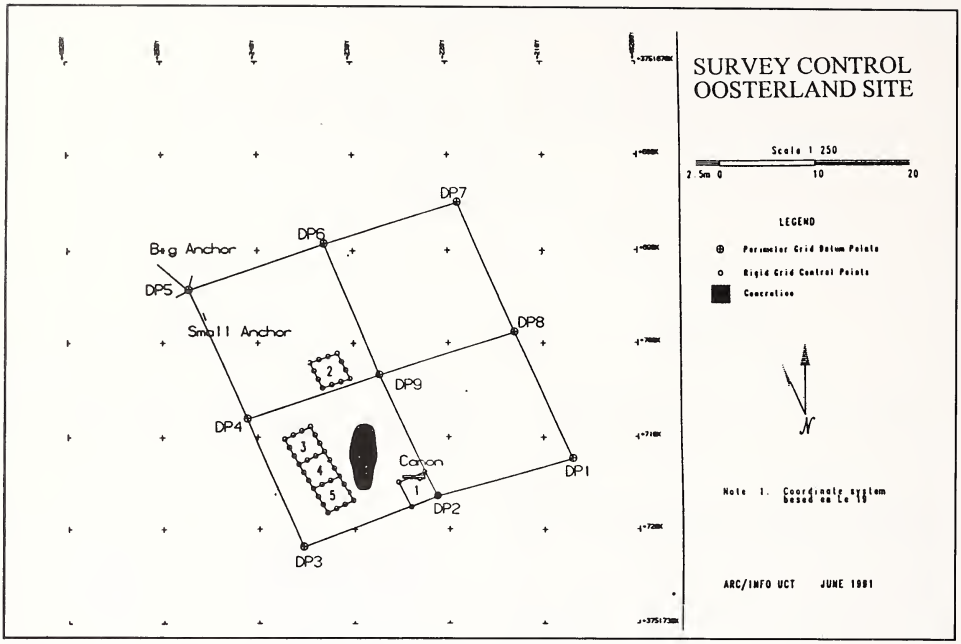

Fig. 5. The *Oosterland* wrecksite, showing the nine perimeter control points and the rigid grids (Breitenmoser, 1991: appendix G).

A navigational chart, published by the Hydrographer, South African Navy, contains bathymetric data which are only a selection of previously acquired survey data. The latter are recorded on a 'fair chart' which may show thousands of soundings, these being of great interest to those more concerned with the details of the relief of the seabed than the navigator. This is especially the case in maritime archaeological research whereby attention is often paid to those areas which show submerged obstacles, indicating possible wreck sites, or areas with a more rugged bathymetry, where the wide dispersal of wrecks and associated artefacts is less likely. Many of these fair charts were produced from surveys using sextant fixes and lead-line soundings, others from electromagnetic position fixing and echo-sounding of more recent decades, but all are recorded on paper. The Hydrographer has a massive programme to convert this traditional record of bathymetric data to digital form which would be acceptable in a GIS. Unfortunately, fair charts of Table Bay have not yet been converted and for the Maritime Archaeological Project, the digitizing was carried out by ourselves for a small area around Robben Island which was the subject of a detailed investigation during 1991-1992, called `Operation Sea Eagle' (Werz 1993b; Werz 1994; Werz 1999:88-103). The coverage for bathymetry was created and 4000 soundings were digitized from fair charts provided by the Hydrographer, which provided the graphical element of the coverage. The values of the soundings were then entered in a Point Attribute Table, `BATH.PAT'. Considering that the area so converted extended just one nautical mile around Robben Island and took sixteen hours to complete, this laborious exercise was not continued for the rest of Table Bay. This must await the availability of digital bathymetry from the Hydrographic Office which, with the introduction of multi-beam sounding techniques, may be realized fairly soon. However, the digital elevation model for that one-mile zone was then used to draw a bathymetric contour map with a two-metre interval and to draw three-dimensional perspective views of the seabed around Robben Island (Fig. 7). The ARC/INFO package SEM was used for these drawings, because it can accommodate input through a coverage and/or ASCII files, where boundaries of the model such as the shoreline are defined by coordinates contained in a `structure line file' (SEM, 1990).

Data for the current coverage were obtained from an oceanographic investigation carried out in 1971 (Van Ieperen, 1971). Of the raw data from 41 stations, that for five were selected and entered in a database file 'CURRENT.DAT'. No further work has been done on this, but what has been done illustrates that a question such as the following can be answered:

> What is the frequency that sub-surface currents between directions 120 and 180 degrees and velocity

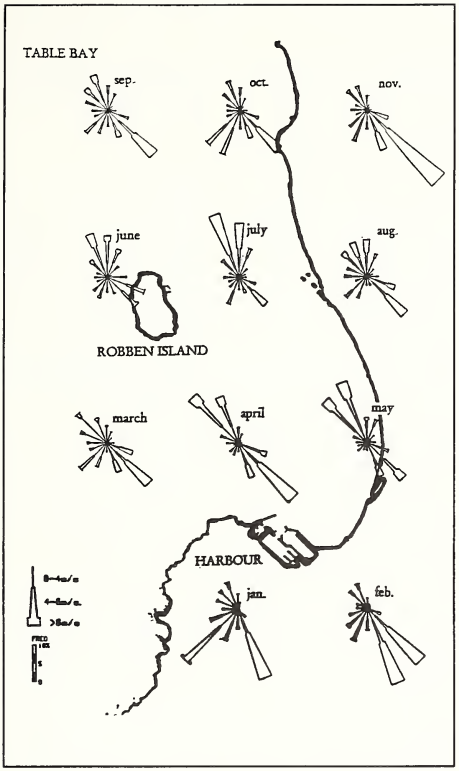

Fig. 6. Table Bay, the area of the GIS project, showing monthly wind roses.

1 m per second or greater coincide with surface currents of the same direction and velocity?

The coverage for sediment deposits has not yet been attempted, except that the source of data depicted graphically has been identified (Woodborne, 1982). This still needs to be digitized and transformed to the GIS format.

The database for shipwrecks has been designed to accommodate those sites which have been already identified, either from artefacts or from documentary evidence or a combination of both, as well as those which will be discovered in the future. Figure 8 shows the 21 sites which were identified during 'Operation Sea Eagle', in which various government departments and the South African Navy participated. This project aimed at assessing the underwater cultural resource within the area of one nautical mile around Robben Island, which hitherto had been declared a restricted zone for shipping and fishing activities.This project has since assisted in the formulation of a plan for the future management of the island, which has played a significant role in the history of South Africa (Werz 1993b; Werz 1994; Werz 1999:88-103). The field work done by surveyors consisted of fixing the positions of wrecks discovered by divers, each wreck thus having an x- and y-coordinate.

As with the geodetic control coverage, the geographical location defined by the coordinate is the link between the graphical record and the non-spatial information. Thus, the map of Table Bay has a graphical coverage showing wreck sites. The coverage is named 'SHIP' and Figure 8 is a part of that coverage. Each site is regarded as a point entity, having an identity number, 'ID', with a unique coordinate, and via this link the non-spatial information can be called up in the form of a Point Attribute Table,

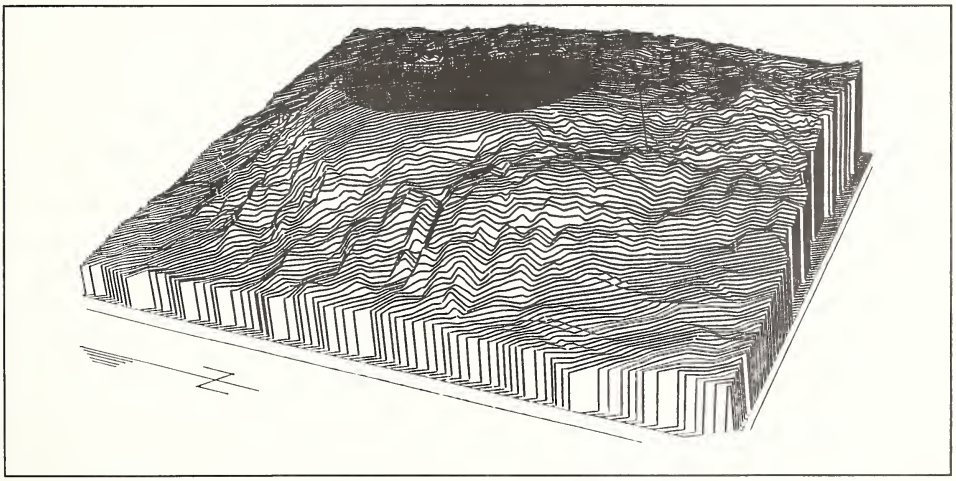

Fig. 7. The seabed within one nautical mile of Robben Island. A perspective view from west-south-west. The island measures approximately 3.5 by 2.0 km.

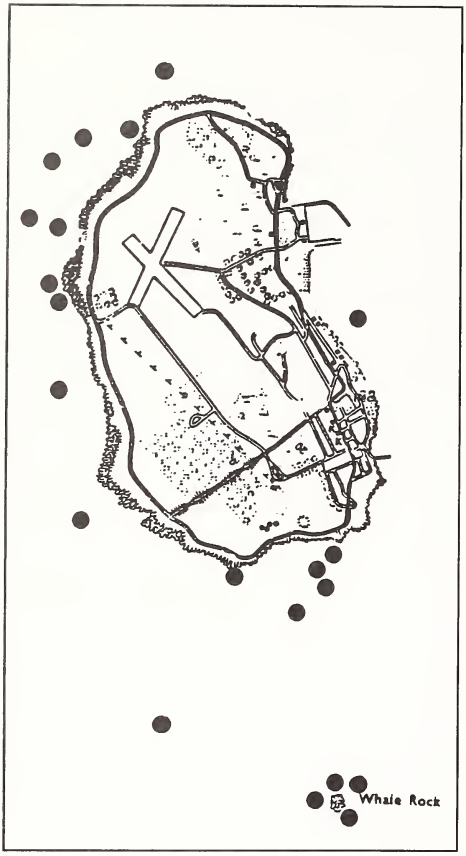

Fig. 8 Shipwreck locations off Robben Island as located during 'Operation Sea Eagle' (after Werz, 1993b).

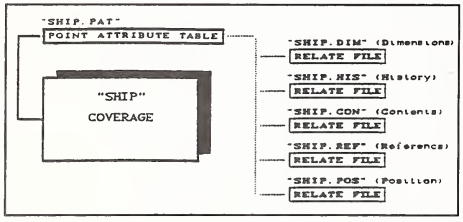

Fig. 9. The shipwreck database (Breitenmoser, 1991: 36).

named `SHIP.PAT'. With the PAT depicted on the screen, the ID of the wreck can be selected and a related file, *e.g.* the dimensions of the ship or its history, can be called up. All non-spatial data, such as that collected from documentary evidence, must be linked in this manner and this allows related data files to be combined. Figures 9

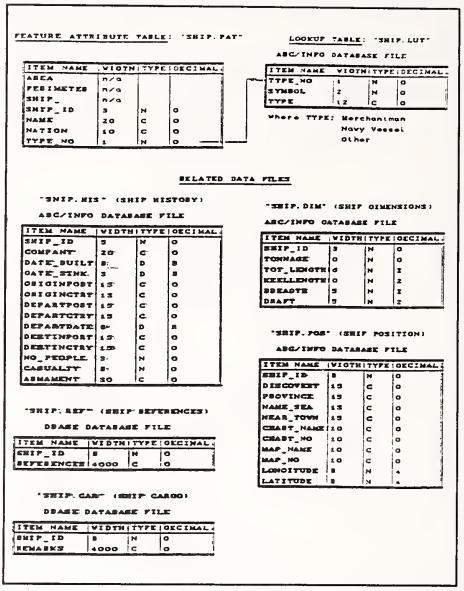
FEATURE ATTRIBUTE TABLE: "SHIP.PAT"
ITEM NAME | WIDTH | TYPE | DECIMAL
AREA | n/a
PERIMETER | n/a
SHIP_ | n/a
SHIP_ID | 3 | N | 0
NAME | 20 | C | 0
NATION | 10 | C | 0
TYPE_NO | 1 | N | 0
LOOKUP TABLE: "SHIP.LUT"
ARC/INFO DATABASE FILE
ITEM NAME | WIDTH | TYPE | DECIMAL
TYPE_NO | 1 | N | 0
SYMBOL | 2 | N | 0
TYPE | 12 | C | 0
Where TYPE: Merchantman
Navy Vessel
Other
RELATED DATA FILES:
"SHIP.HIS" (SHIP HISTORY)
ARC/INFO DATABASE FILE
ITEM NAME | WIDTH | TYPE | DECIMAL
SHIP_ID | 3 | N | 0
COMPANY | 20 | C | 0
DATE_BUILT | 8 | D | 8
DATE_SINK | 8 | D | 8
ORIGINPORT | 15 | C | 0
ORIGINCTRY | 15 | C | 0
DEPARTPORT | 15 | C | 0
DEPARTCTRY | 15 | C | 0
DEPARTDATE | 8 | D | 8
DESTINPORT | 15 | C | 0
DESTINCTRY | 15 | C | 0
NO_PEOPLE | 3 | N | 0
CASUALTY | 3 | N | 0
ARMAMENT | 20 | C | 0
"SHIP.DIM" (SHIP DIMENSIONS)
ARC/INFO DATABASE FILE
ITEM NAME | WIDTH | TYPE | DECIMAL
SHIP_ID | 3 | N | 0
TONNAGE | 4 | N | 0
TOT_LENGTH | 4 | N | 1
KEELLENGTH | 4 | N | 1
BREADTH | 3 | N | 1
DRAFT | 3 | N | 1
"SHIP.REF" (SHIP REFERENCES)
DBASE DATABASE FILE
ITEM NAME | WIDTH | TYPE | DECIMAL
SHIP_ID | 3 | N | 0
REFERENCES | 4000 | C | 0
"SHIP.POS" (SHIP POSITION)
ARC/INFO DATABASE FILE
ITEM NAME | WIDTH | TYPE | DECIMAL
SHIP_ID | 3 | N | 0
DISCOVERY | 15 | C | 0
PROVINCE | 15 | C | 0
NAME_SEA | 15 | C | 0
NEAR_TOWN | 15 | C | 0
CHART_NAME | 10 | C | 0
CHART_NO | 10 | C | 0
MAP_NAME | 10 | C | 0
MAP_NO | 10 | C | 0
LONGITUDE | 9 | N | 4
LATITUDE | 9 | N | 4
"SHIP.CAR" (SHIP CARGO)
DBASE DATABASE FILE
ITEM NAME | WIDTH | TYPE | DECIMAL
SHIP_ID | 3 | N | 0
REMARKS | 4000 | C | 0

Fig. 10. Structure of the Point Attribute Table 'SHIP' and related data files (Breitenmoser, 1991: appendix E).

and 10 show the structure of SHIP.PAT and related data files respectively.

Returning to Figure 3, we have described the first coverage of the database for shipwrecks.Two other coverages are included for artefacts discovered, whether they are point entities, *e.g.* cannon balls, or line (*i.e.* arc) entities *e.g.* ship's timbers. In the same diagram, there are three more coverages for perimeter grid, rigid grid and shore control.These and the two artefact coverages, points or lines, are used once detailed investigation and excavation of a particular site has commenced. To date, only one wreck has been so studied and this project is described below.

THE *OOSTERLAND* GIS

Archaeological sites are unique and require particular survey solutions according to the conditions prevailing, bearing in mind that the end product of the survey measurements is the record of position. This also applies to the *Oosterland* project. The shipwreck of the *Oosterland,* a Dutch East India Company vessel which foundered on 24 May 1697 while lying at anchor in Table Bay, was discovered in December 1988 by local divers M. Barchard, C. Byrnes and G. Raynor. Since 1990, this wrecksite has been the subject of a maritime archaeological excavation as part of the MAP of Table Bay (Werz 1989; Werz 1990; Werz 1992b; Werz 1992c; Werz 1993a; Werz 1999: 104-133).

Table 1. Comparison of precision coordinates obtained from underwater trilateration and theodolite intersections (Breitenmoser, 1991: 12).

Underwater Control (Perimeter) Points	Precision resulting from underwater trilateration		Precision resulting from shore stations	
	Standard deviation in metres			
	Sx	Sy	Sx	Sv
SE (DP1)	0.06	0.06	0.38	0.58
S (DP2)	0.05	0.04	0.54	1.06
SW (DP3)	0.05	0.04	0.25	0.52
W (DP4)	0.04	0.04	0.27	0.54
NW (DP5)	0.06	0.06	0.31	0.61
N (DP6)	0.04	0.05	0.52	0.90
NE (DP7)	0.06	0.06	0.21	0.37
E (DP8)	0.04	0.05	0.22	0.39
C (DP9)	0.03	0.09	0.21	0.40

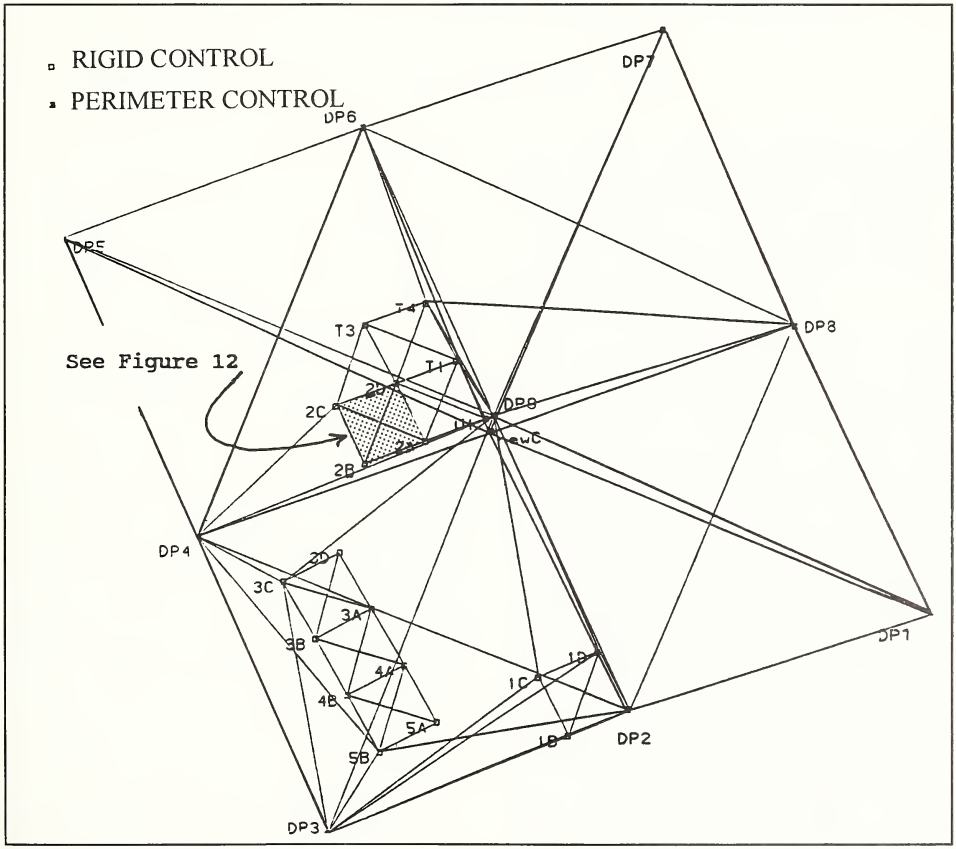

Fig. 11. The underwater control network, as adjusted (Breitenmoser, 1991: 15).

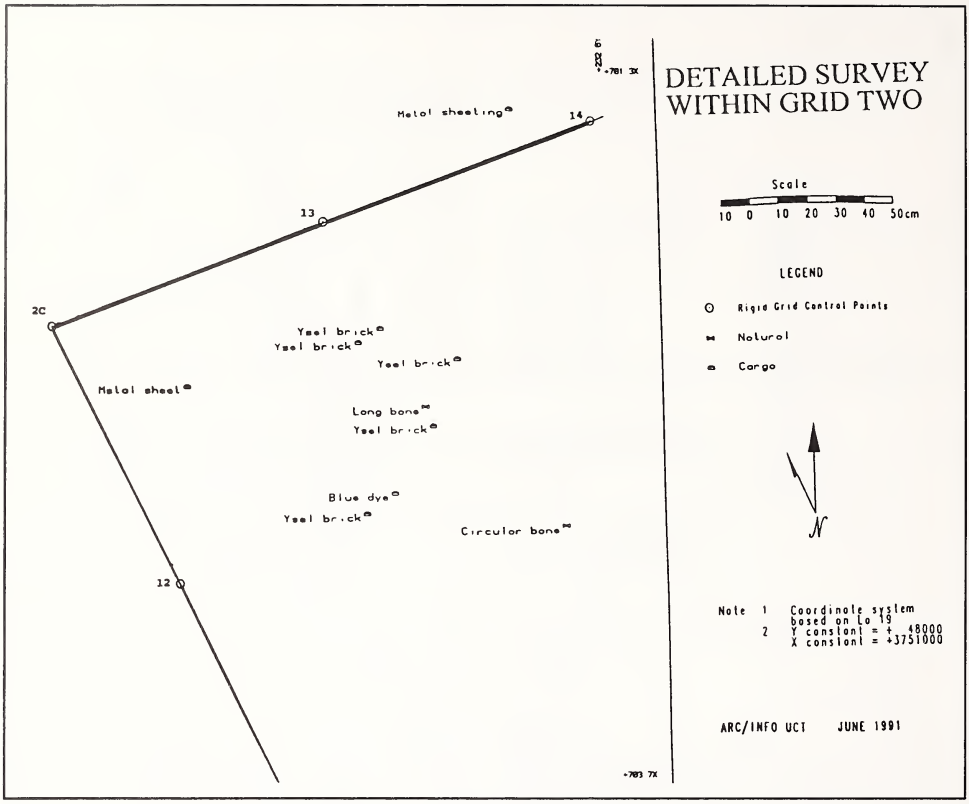

Fig. 12. A part of rigid grid 2, showing markers at 1 m intervals from which three direct tape measurements are taken to each artefact.

The requirements of the *Oosterland* GIS are: to record the location of the wreck, which is already provided by the Table Bay GIS as described earlier; to map the positions of artefacts for the study of their spatial relationships, for example, the arrangement on site of items of cargo; and to establish a database for artefacts to ease access for enquiry into their attributes. In the design of the database, queries expected from archaeologists are assumed and the need for maintenance and up-dating as more artefacts are recovered is taken into account. Also, from the ARC/INFO coverages it must be possible to produce cartographic layers in proper registration for subsequent hard copy output, which is facilitated by the national geodetic coordinate system on which the surveying is based. It is appropriate here to describe briefly the methods by which the survey is done, although this has been reported on in detail elsewhere (Werz, 1993a: 35-39; Werz & Martin, 1994; Werz 1999: 122-125).

The *Oosterland* site is situated only 250 m from the high-water mark in the breaker zone. The known extent of the site at present is approximately 30 by 30 m but could well become greater as excavation progresses. This area is demarcated on the seabed by nine Perimeter Datum Points or PDP's, approximately 15 m apart in the form of a grid and orientated to the magnetic north. Within this perimeter grid, rigid grids measuring 3 by 3 m are assembled around those areas earmarked for excavation. Each side of a rigid grid is marked at 1 m intervals and, once exposed, the position of artefacts is determined by direct tape measurements from the markers to the artefacts. Thus the sequence of survey is as follows:

1. establishing shore control based on the position of triangulation pillar 265 (Fig. 4);
2. determining the positions of the Perimeter Datum Points (PDP's) from the shore control by means of a theodolite survey to buoys which are attached to the PDP's (Table 1);
3. determining the positions of the rigid grids from the PDP's and hence the positions of the grid markers by direct tape measurements (Fig. 11); and,

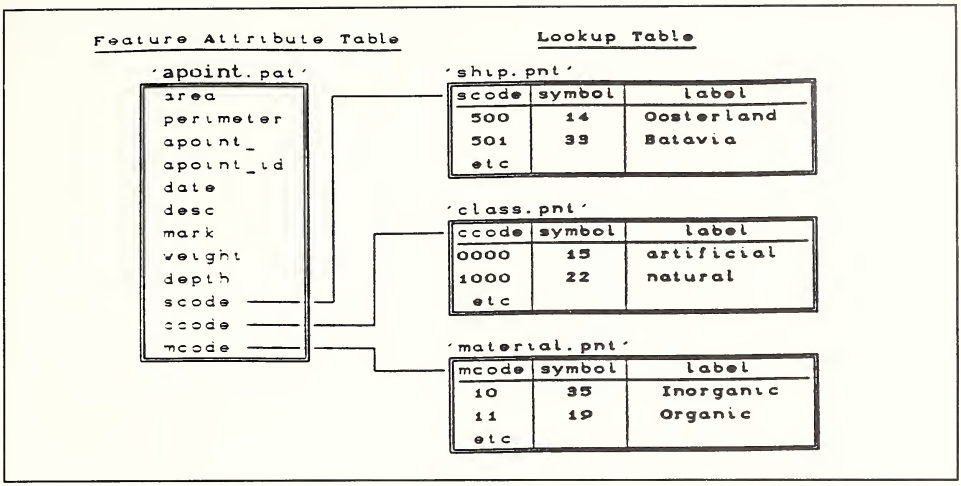

Fig. 13. Conceptual view of the database for artefacts (Breitenmoser, 1991: 31).

4. determining the positions of artefacts from the markers by direct tape measurements (Fig. 12).

By this procedure, all points (*i.e.* those on shore, the PDP's, the markers and artefacts) are provided with x and y coordinates.

Concerning the GIS, two separate coverages for artefacts were created: one for artefacts represented by point features, *e.g.* ceramics, instruments, ornaments, *etc.* and one for artefacts represented by arc features, *e.g.* cannons and large timbers. Artefacts may be represented upon a conventional map by a symbol having certain characteristics, *e.g.* colour, pattern, font and size. In ARC/INFO, the same characteristics can be stored in a 'markerset file' and artefacts are linked to these. Figure 13 illustrates the design of a 'Feature Attribute Table', in this case a 'Point Attribute Table' (PAT) with associated 'Lookup Tables', which identify the code number for a particular symbol according to the ship's name, the class and the material of which a specific artefact was made. A Feature Attribute Table maybe constituted as a Point Attribute Table, an Arc (*i.e.* line) Attribute Table or a Polygon Attribute Table according to the nature of the artefact. Examples of a Point Attribute Table and an Arc Attribute Table, from the *Oosterland* GIS, are shown in Tables 2 and 3 respectively.

At the beginning of this paper it was explained that the three basic graphic elements of a GIS are points, arcs and polygons. In the GIS for Table Bay, very few polygons were used, the only examples being the shoreline of Robben Island, the occasional building, and at a later stage the geology once that has been digitised. In this context, a polygon is defined as being a closed perimeter consisting of arcs. When a Polygon Attribute Table (PAT) is created, the first two attributes listed for a polygon are area and length of perimeter, followed by other attributes according to the design. Such a table is not illustrated here, but the reader should refer to Table 2 which is a Point Attribute Table. This is also called a PAT, because what is a point but a polygon with no area or measurable perimeter ! This explains why the first two items listed in Table 2 are strings of zeros. Thus, this part of the software can accommodate both points and polygons.

When a file is created in the tabular, non-graphical section of a GIS, its structure must first be designed by listing those items which will be entered once the data have been collected. Referring again to Table 2, which shows the structure of the table and its output, the first item is 'area' and the size of the area is listed from the first column of the output table. The type of entry is numeric (N) and six decimal places are allowed for. The next item is 'perimeter'. This starts on the 14th column and is treated similarly. Item 'APOINT' is an identification number entered automatically by the computer in the order that the data are entered and cannot be changed by the operator. 'APOINT-ID' is the identification number given by the archaeologist and need not be sequential. For both 'APOINT-ID' and 'APOINT', a width of 11 spaces is provided of numerical type with no decimal places. Then follows the name, in character type with five spaces provided and enclosed in quotation marks, date of excavation and a written description as given by the archaeologist, in character type and also in quotation marks. The following two items provide for the record of artefact weight and depth below the water surface. In this specific example, no artefact weight was recorded and a nominal water depth of 5 m was maintained. The last three items, 'SCODE', 'CCODE' and 'MCODE', are those described earlier with reference to symbols used as shown in Figure 13.

Table 2. Extract from an artefact Point Attribute Table (PAT), with the parameters given at the top (Breitenmoser, 1991: appendix E).

Point Attribute Table (PAT) Table structure

COVERAGE: APOINT

ATTRIBUTE PARAMETERS:

COLUMN	ITEM NAME	WIDTH	TYPE	N.DEC
1	AREA	13	N	6
14	PERIMETER	13	N	6
27	APOINT_	11	N	0
38	APOINT_ID	11	N	0
49	NAME	5	C	0
54	DATE	8	D	0
62	DESC	30	C	0
92	WEIGHT	5	N	2
97	DEPTH	6	N	2
103	SCODE	3	N	0
106	CCODE	5	N	0
111	MCODE	2	N	0

Table output

COVERAGE: APOINT

FEATURE: POINTS

REMARKS: SMALL ARTEFACTS REPRESENTED BY POINTS

SOURCE: E BREITENMOSER

DATE: 17/10/1991

0.0000000E+00,0.0000000E+00,1,4,'CBL',19910404,'Centre Basket Lid',0.00,5.00,500,1000,11
0.0000000E+00,0.0000000E+00,2,5,'V1',19910326,'Min B&W Vase',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,3,6,'DOG2',19910326,'Dog',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,4,7,'BWVL3',19910326,'B&W Vase + Lid',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,5,8,'BL1',19910330,'Budhist Lion',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,6,9,'VOC',19910330,'V.O.C. Spoon',0.00,5.00,500,5000,16
0.0000000E+00,0.0000000E+00,7,10,'04/15',19910119,'Various Armaments',0.00,5.00,500,6000,21
0.0000000E+00,0.0000000E+00,8,11,'0-18',19910127,'Concretion',0.00,5.00,500,11000,21
0.0000000E+00,0.0000000E+00,9,12,'2-?',19910127,'Sheat',0.00,5.00,500,11000,33
0.0000000E+00,0.0000000E+00,10,13,'2-5/8',19910127,'Metal Sheating',0.00,5.00,500,9000,13
0.0000000E+00,0.0000000E+00,11,14,'2-7',19910203,'Long Bone',0.00,5.00,500,1000,11
0.0000000E+00,0.0000000E+00,12,15,'2-8',19910203,'Circular Bone',0.00,5.00,500,1000,11
0.0000000E+00,0.0000000E+00,13,16,'2-9',19910203,'Ysel Brick',0.00,5.00,500,9000,30
0.0000000E+00,0.0000000E+00,14,17,'2-10',19910203,'Ysel Brick',0.00,5.00,500,9000,30
0.0000000E+00,0.0000000E+00,15,18,'2-11',19910203,'Ysel Brick',0.00,5.00,500,9000,30
0.0000000E+00,0.0000000E+00,16,19,'2-12',19910203,'Ysel Brick',0.00,5.00,500,9000,30
0.0000000E+00,0.0000000E+00,17,20,'2-13',19910203,'Ysel Brick',0.00,5.00,500,9000,30
0.0000000E+00,0.0000000E+00,18,21,'2-14',19910203,'Ysel Brick',0.00,5.00,500,9000,30
0.0000000E+00,0.0000000E+00,19,22,'WV1',19910212,'White Vase',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,20,23,'BJ5',19910212,'Bellarmine Jug',0.00,5.00,500,0,30
0.0000000E+00,0.0000000E+00,21,24,'EG3',19910221,'Eagle',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,22,25,'BJ7',19910221,'Bellarmine Jug',0.00,5.00,500,0,30
0.0000000E+00,0.0000000E+00,23,26,'LS1',19910223,'Leather Shoe',0.00,5.00,500,10000,24
0.0000000E+00,0.0000000E+00,24,27,'BWV4',19910308,'B&W Vase',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,25,29,'BWV',19910309,'B&W Vase',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,26,30,'BC1',19910312,'Brass Candle',0.00,5.00,500,5000,18
0.0000000E+00,0.0000000E+00,27,31,'BWL2',19910312,'B&W Lid',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,28,32,'Log3',19910312,'Log',0.00,5.00,500,1000,11
0.0000000E+00,0.0000000E+00,29,33,'CC4',19910312,'Concretion',0.00,5.00,500,11000,21
0.0000000E+00,0.0000000E+00,30,34,'WBL1',19910314,'White Budhist Lion',0.00,5.00,500,0,29
0.0000000E+00,0.0000000E+00,31,35,'BUD2',19910314,'Budha',0.00,5.00,500,0,29

Table 3. Extract from an artefact Arc Attribute Table (AAT), with the parameters given at the top (Breitenmoser, 1991: appendix E).

Arc Attribute Table (AAT) — Table structure

COVERAGE: ALINE

SPECIFICATIONS OF ITEMS:

COLUMN	ITEM NAME	WIDTH	TYPE	N.DEC
1	FNODE_	11	N	0
12	TNODE_	11	N	0
23	LPOLY_	11	N	0
34	RPOLY_	11	N	0
45	LENGTH	13	N	6
58	ALINE_	11	N	0
69	ALINE_ID	11	N	0
80	NAME	5	C	0
85	DATE	8	D	0
93	DESC	30	C	0
123	WEIGHT	7	N	2
130	DEPTH	6	N	2
136	SCODE	3	N	0
139	CCODE	5	N	0
144	MCODE	2	N	0

Table output

```
COVERAGE: ALINE

FEATURE: LINES

REMARKS: LARGE ARTEFACTS REPRESENTED BY LINES

SOURCE: E BREITENMOSER

DATE: 17/10/1991


2,1,1,4,0.1316326E+01,1,3,'T1a',19910317,'Timber',0.00,-5.00,500,1000,11
4,2,3,5,0.2066022E+00,2,3,'',0,'',0.00,-5.00,500,1000,11
4,2,1,3,0.8224468E+00,3,1,'T2TAG',19910316,'Timber',0.00,-5.00,500,1000,11
1,5,1,4,0.1383841E+01,4,3,'',0,'',0.00,-5.00,500,1000,11
2,5,4,5,0.2297725E+00,5,1,'',0,'',0.00,-5.00,500,1000,11
6,4,7,5,0.1961700E+00,6,1,'',0,'',0.00,-5.00,500,1000,11
5,6,8,5,0.2208640E+00,7,3,'',0,'',0.00,-5.00,500,1000,11
6,4,1,7,0.1482318E+01,8,3,'',0,'',0.00,-5.00,500,1000,11
3,7,1,6,0.9988473E+00,9,2,'T3tag',19910316,'Timber',0.00,-5.00,500,1000,11
7,8,9,6,0.3585649E+00,10,6,'MC1',19910404,'Concretion',0.00,-5.00,500,11000,21
8,3,1,6,0.1506683E+01,11,2,'',0,'',0.00,-5.00,500,1000,11
5,9,1,8,0.1435896E+01,12,1,'',0,'',0.00,-5.00,500,1000,11
9,6,1,8,0.1740653E+01,13,1,'',0,'',0.00,-5.00,500,1000,11
7,8,2,9,0.1537916E+01,14,2,'',0,'',0.00,-5.00,500,1000,11
11,11,1,11,0.5998204E+01,15,5,'P1',19910113,'Canon',0.00,-5.00,500,6000,18
8,12,2,1,0.4384624E+01,16,6,'',0,'',0.00,-5.00,500,11000,21
12,7,2,1,0.1157216E+02,17,6,'',0,'',0.00,-5.00,500,11000,21
10,10,1,10,0.1010756E+02,18,4,'T2a',19910317,'Timber',0.00,-5.00,500,1000,11
```

Table 3 is an Arc Attribute Table (AAT) of similar design and it is sufficient here to describe the differences between AAT and PAT only. An arc has terminals known as the 'From-node' ('FNODE') and the 'To-node' ('TNODE') and these are the first two items listed. The IDs of these taken from the PAT are given. As arcs contribute towards the definition of polygons, a polygon will be created on the left and another on the right, which can be visualized on the computer screen, as one proceeds from FNODE to TNODE. These are the next two items

listed as 'LPOLY' and 'RPOLY', followed by 'LENGTH'. The other items are the same as those described for the PAT.

The archaeologist and the surveyor

Multi-disciplinary cooperation is the hallmark of projects such as the MAP for Table Bay. In those fields where he becomes involved, the role of the surveyor is : to record position; to monitor movement; and to store and manage the data. Due to its versatile application, a Geographical Information System seems to be the most appropriate tool for the filing and interpretation of information retrieved from archaeological sites. In the context of GIS, the following stages should be thoughtfully planned:

1. collection (by archaeologists and divers);
2. storage (by surveyors and archaeologists);
3. retrieval (by archaeologists and surveyors); and
4. analysis (by archaeologists).

The establishment of a GIS is not an end in itself but is the means towards better data management. All participants in a project such as the one described in the above should be aware of the guiding principles of good data management at each stage of the project and the value of different contributions that participants can provide. Very recent developments, such as the introduction of the World Geodetic System (WGS 84) and multi-beam sounding techniques for underwater surveys in South Africa will further enhance this project.

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RESULTS FROM A TEST EXCAVATION AT GROOT KOMMANDOKLOOF SHELTER IN THE BAVIAANSKLOOF/KOUGA REGION, EASTERN CAPE PROVINCE*

JOHAN BINNEMAN

Department of Archaeology, Albany Museum, Somerset Street, Grahamstown, 6139

email: J.Binneman@ru.ac.za

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ABSTRACT

Groot Kommandokloof Shelter was excavated during the 1980s as part of a long term archaeological project in the Kouga/Baviaanskloof mountains. The bottom unit was dated to 6430 BP. Well-preserved botanical remains were recovered from the surface unit. Small underground plant species were ignored in favour of *Watsonia* sp. which was the main plant food collected. This, together with a large number of small ostrich eggshell chippings and other cultural material recovered from the surface unit, suggest that the site was used for special activities during the past ca 2000 years. Two human skeletons were also found.

INTRODUCTION

Groot Kommandokloof Shelter is one of several small shelters and caves test excavated during the 1980s in the Baviaanskloof/Kouga mountain region in the south-eastern Cape (Fig. 1). The project proposal, results from two other sites in this region and the present day environment have been discussed elsewhere (see Binneman 1997, 1998).

This small shelter (33.40 S; 24.07 E) is located in the heart of the Kouga Mountains some 900 m above sea level and 12 km in from the Baviaanskloof valley (Fig. 2). The shelter faces north-east and measures 18 m wide by 8 m deep and the roof is some 8 m high at the dripline (Fig. 3 & 4). The immediate environment consists of Table Mountain Sandstone and Mountain Fynbos. There is no standing water nearby and a small stream near the shelter only flows during heavy rains.

Due to its position, the shelter is exposed to direct sunlight for most of the early morning and protected from the westerly winds and winter rainfall. These favourable climatic conditions played an important role in preserving botanical remains in the surface unit.

Most of the rock art is badly faded, but there are still a few clear paintings visible along the back wall. Among the paintings are a white buck, finger prints, and several figures, of which at least one is painted in a trance posture.

During the first visit to the site a partly exposed skull of a burial was discovered eroding from the shelter's surface. According to local people they visited the shelter occasionally to remove honey from a bee-hive in the roof of the shelter. During the visit an active hive and a long homemade ladder were encountered in the shelter, which led to the decision to excavate the skeleton before it could be disturbed or even removed by visitors.

The well-preserved botanical remains from the surface unit provided the chance to contrast the subsistence patterns between sites in the high mountains and the well-watered Baviaanskloof valley floor during the past ca 2000 years.

EXCAVATION AND DATING

The deposit was 0,50 m deep and the 9 units identified are described from bedrock to the surface. (Fig. 5).

Overlying bedrock was a thick layer of black carbonized organic material and ash (BCL), radiocarbon dated to 6430 ± 70 BP. A juvenile burial, resting on the rock floor and covered by a stone cairn, was found buried in a shallow hollow in this unit. BCL was rich in cultural material.

A thin layer of soft yellow loam and ash (YA) covered the stone cairn and BCL. Underlying YA, was thick layer of compacted red-brown loams and patches of grey and mottled white ash (RB/MA), also rich in cultural material. The hard orange ash was followed by a thin layer of soft yellow soil (SYS) fairly rich in cultural material.

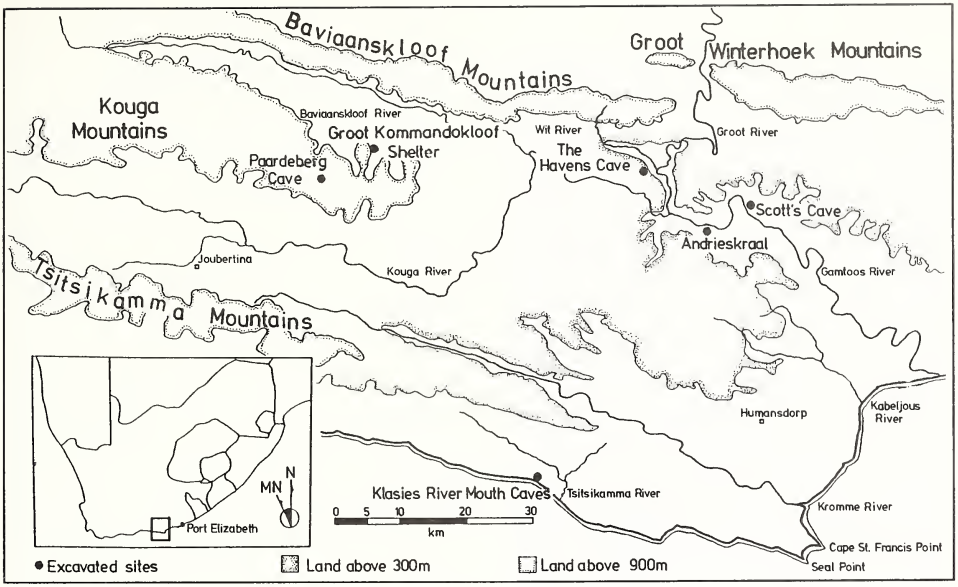

Fig. 1. Map of the south-eastern Cape and the location of Groot Kommandokloof shelter.

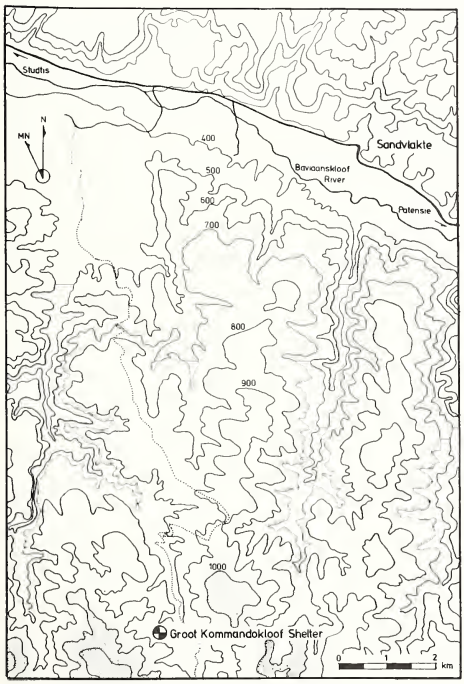

Fig. 2. Location of Groot Kommandokloof Shelter.

Overlying SYS was a hard, compacted orange ash (OA) with patches of white ash and a small circular ash feature with carbonized plant material (OA/AF). This was followed by thick layers of grey ash (GA) and hard compacted pink ash (PA). PA consisted of a thin lense in the front part of the square and was replaced by a shallow depression filled with soft grey loose soil (SGS) towards the rear of the cave.

The surface unit (Bedding), comprised thin layers of burnt and compacted unburnt plant material, mainly grasses, between 10 cm and 20 cm thick. Mixed with the grass were a wide range of edible and medicinal plant remains and botanical artefacts (Tables 1 & 2).

SUBSISTENCE AND DIET

Plant remains

Unlike the other sites investigated in the Kouga/ Baviaanskloof mountains, *Cyperus usitatus* was totally absent from the bedding unit at Groot Kommandokloof Shelter. *Watsonia* sp. represented the bulk of the under ground plant food remains. *Freezia* sp. were also present in small quantities (Table 1). The only other plant food collected of any noticeable value was *Dioscorea elephantipes*. Seed remains were poorly represented at the site and even *Pappea capensis* and *Schotia* sp. remains were found only occasionally.

An interesting find was the abundant remains of *Protea nitida* Mill. (`waboom'). This tree grows in large numbers in the vicinity of the shelter. Although the remains probably entered the shelter as fire wood, the tree

Fig. 3. View of Groot kommandokloof Shelter.

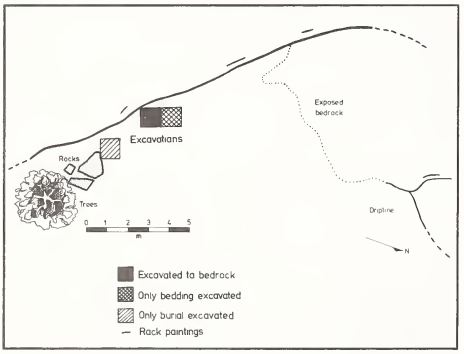

Fig. 4. Plan and excavations at Groot Kommandokloof Shelter.

has a wide variety of uses. Early settlers used the wood to manufacture felloes for wagon wheels. The leaves when crushed and mixed with water make a durable writing ink (one may speculate that it could have been used as paint or ingredient for paint). The bark can also be used to tan hides and for an infusion for treating diarrhoea (Coates Palgrave 1977:131).

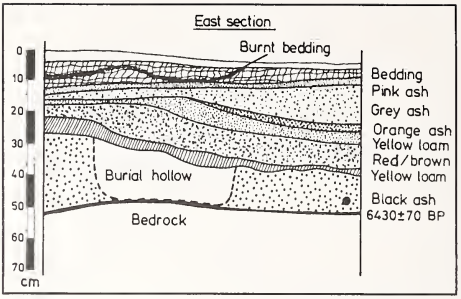

Fig. 5. Section drawing of the excavation.

Another medicinal plant not encountered at any of the other sites, was *Passerina* cf. *filiformis* L. The `hottentots' drank a decoction of this plant for the relief of shooting pains (Watt & Breyer-Brandwijk 1962:1025). *Hypodiscus aristatus* remains were also common in the bedding unit and were collected for the seeds which were made into beads.

Faunal remains

The mammal remains are represented by mainly small animals such as *Procavia capencis*, *Lepus* sp, *Oreotragus oreotragus* and *Raphicerus* sp. with the occasional larger animals such as *Equus* cf. *zebra* (Table 3).

Marine shell fragments were found in all the units except for BCL. The shell remains were presumably collected and transported to the shelter for decorative purposes after visits to the coast or traded from people who did visit the coast.

CULTURAL REMAINS

Lithic remains

The lithic industry is similar to that described at THC (Table 4) (Binneman 1997). As expected, quartzite comprised between 51% and 78% of the raw material used at the site with quartz a distat second with between 17% and 44%. Other raw materials such as silcrete, hornfels and chalcedony were present in small quantities.

Formal tools however, were mainly manufactured from quartz crystals which were found throughout the sequence.

Non-lithic artefacts

Apart from the bedding unit, few non-lithic cultural items were recovered from the test excavation and remains were virtually absent from the bottom three units. There is a slight increase in non-lithic items upwards in the sequence, mainly due to the presence of ostrich eggshell (Table 5). Beads and fragments were relatively abundant in the bedding unit. A large number of small chips were found which suggest active bead manufacturing. Pottery was found only in the bedding unit and included two decorated fragments. A wide variety of botanical artefacts

Table 1. Analysis of bulk samples of plant remains from Groot Kommandokloof Shelter.

	Bedding
WEIGHT	
Unsieved	3997,5
1mm mesh	1179,2
3mm mesh	821,1
NON BOTANICAL	
Waste stone	218,8
Stone tools	158,0
Pottery	4,5
OES	3,3
Freshwater shell	0,4
Bone	26,1
Insects	0,2
Earth lumps	16,5
PROCESSED PLANT MATERIAL	
REEDS	
Fragments	0,4
cut	0,2
CYPERUS TEXTILIS	
cordage	0,1
matting	0,2
WOODEN ARTEFACTS	
pegs	1,2
shavings	12,0
GRASSES	
stems and bases	43,1
INFLORECENCES	
Themeda triandra	0,1
Hypodiscus aristatus	2,4
Protea nitida	6,0
SEEDS AND FRUITS	
Schotia sp.pods	0,3
Pappea capensis	0,2
Olea Capensis	0,1
Euclea sp.	0,3
Hypodiscus aristatus	0,7
EDIBLE AND MEDICINAL	
Watsonia sp.	
corm tunics	5,6
corm bases	4,0
Freezia/Tritonia sp.	
corm tunics	0,1
corm bases	0,4
Dioscorea elephantipes	2,0
Passerina filiformis	0,4
Grassula/Cotyledon sp.	6,1
LEAVES	29,8
OTHER INCLUSIONS	
Charcoal	26,1
Twigs and bark	67,8
Thorns	0,1
H. aristatus stems	1,7
Misc. unidentified	14,5
BOTANICAL ARTEFACTS	
Seed beads	0,1
Grass bangle	0,2

Table 2. Frequencies of pottery and bothanical artefacts from Groot Kommandokloof Shelter.

POTTERY	
Fragments	36
R/decoration	1
B/decoration	1
Total	**38**
WOOD	
Pegs	5
Fire drills	
female	1
Cut pieces	2
Shavings	*
Total	**8**
REED	
Cut/notched	1
Ochre stained	1
Total	**2**
CYPERUS	
Cordage	3
Matting	15
Netting	2
Total	**20**
SEED BEADS	
H. aristatus	12
OTHER ARTEFACTS	
Plant bangles	1
Total	**1**
OTHER INCLUSIONS	
Mastic	1
Total	**1**
* Present in relatively large numbers	

were recovered from the excavation which included fragments of cordage, matting, netting, wooden pegs, wood shavings and seed beads.

BURIALS

KK1/1

The burial was situated one metre from the back wall of the shelter. The skull was partly exposed when discovered and displayed a peculiar oval shaped hole on

Table 3. Faunal Remains from Groot Kommandokloof Shelter.

	BED	PA	SGA	GA	OA	SYS	RB	YA	BCL	TOTAL
MAMMALS										
Small carnivore						1				1
Procavia capensis	1	1	1	1	2	1	1	1	1	10
Equus cf *zebra*	1									1
Raphicerus sp.		1	1		1	1	1	1		6
Oreotragus oreotragus	1						1		1	3
Lepus sp.							1	1	1	3
Bovidae - general										
small				1						1
small medium	1			1	1	1			1	5
large medium									1	1
TOTAL	**4**	**2**	**2**	**3**	**4**	**4**	**4**	**3**	**5**	**31**
REPTILES (tortiose)	*	*								
MARINE SHELL										
Perna perna	1	2	2	1	1	1	1			9
Patella sp.		1				1				2
Donax serra	1		1	1		1	1	1		6
Marginella sp.					1					1
Turbo sarmaticus						1	1	1		3
Haliotis sp.						1				1
Conus sp.	2									2
Barnacle				1						1
Unidentified						1				1
TOTAL	**4**	**3**	**3**	**3**	**2**	**6**	**3**	**2**		**26**
FRESHWATER SHELL										
Unio caffer	1									1
TOTAL	**1**									1
LANDSNAIL										
Acatina zebra			1	1	1	1				
Total			**1**	**1**	**1**	**1**				**4**

* Present

the right parietal bone (Fig. 6). The burial was that of a woman approximately thirty years of age (P. Rightmire pers. comm.). No bone growth is visible in the damaged area and it is not known whether the hole caused the individual's death.

It is clear from Figure 7 that the bones of the skeleton were disturbed, possibly by rodents or even re-burial. The entire shallow grave hollow consisted of a rodent burrow. Some of the bones, such as the atlas, were found nearly 40 cm from the first vertebra. The skull has moved about 20 cm.

Notwithstanding, it would appear that the woman was buried on her right side in a flexed position, presumably facing in an easterly or north-easterly direction. At least one large flat grindstone covered the remains although there could have been more stones. Three copper beads and a tortoise bone pendant were the only grave goods found with the burial.

KK1/2

Another burial, that of a juvenile, was found on bedrock in the test pit excavated against the back wall. The juvenile was lying on its right side in a stretched out position (Fig. 8a). A large pile of fifteen stones covered the remains (Fig. 8b). The cairn of stones included ochre stained hammerstones, anvils, flaked cobbles, flakes and

Table 4. Frequancies of stone artefacts from Groot Kommandokloof Shelter.

	BED	PA	SGA	GA	OA	SYS	RB	YA	BCL	TOTAL
WASTE										
Chips	342	579	465	502	370	763	1431	219	2082	6753
Chunks	11	19	16	17	13	22	19	5	38	160
Cores	3	-	2	4	-	7	19	-	21	56
CRP	1	14	8	6	6	16	33	3	59	146
Flakes	441	559	565	585	333	783	1267	199	1687	6419
TOTAL WASTE	797	1171	1056	1114	722	1591	2769	426	3887	13533
Waste as % of Grand Total	98,3	97,6	99,0	99,1	98,1	97,7	98,3	97,3	97,7	98,1
UTILISED										
Flakes	4	7	2	1	-	4	2	-	14	34
Hammerstones	-	-	-	-	-	-	1	-	-	1
Hammerst/rubbers	-	-	1	-	-	-	1	-	-	2
TOTAL UTILIZED	4	7	3	1	-	4	4	-	14	37
Utilized as % of Grand Total	0,5	0,6	0,3	0,1	-	0,5	0,2	-	0,4	0,3
FORMAL TOOLS										
Scrapers	5	11	3	8	11	28	36	12	62	176
Adzes	1	2	2	-	1	1	-	-	2	9
Cobble adze	-	1	-	-	-	-	-	-	-	1
Grindstone/adze	-	-	-	-	-	-	1	-	-	1
Segments	-	-	-	-	1	-	-	-	1	2
Borers	1	1	-	-	1	-	1	-	-	4
Backed blades	1	-	-	-	-	-	-	-	-	1
Misc. retouched	1	-	-	-	-	-	1	-	-	2
Bored stone	1	-	-	-	-	-	-	-	-	1
TOTAL FORMAL	10	15	5	8	14	29	39	12	65	197
Formal tool as % of Grand Total	1,2	1,8	0,7	0,8	1,9	2,0	1,5	2,7	2,0	1,7
GRAND TOTAL	811	1200	1067	1124	736	1628	2816	438	3980	13 800
OTHER										
Ochre (grams)	30,4	31,4	47,6	24,6	12,6	56,2	46,7	2,4	63,3	
Shale (grams)	-	3,6	8,1	59,6	1,4	38,6	18,6	0,1	408,5	
Crystals	-	11	7	7	6	13	22	-	46	

rock. Among these was a stone with a possible human figure `painted' in back on it (Binneman & Hall 1993). Underneath the cairn were two large flat grindstones, placed directly on top of the skeleton. One was red ochre stained (Fig. 8c).

DISCUSSION

Although the samples from the test excavation at Groot Kommandokloof Shelter are small, which obviously limit the degree of explanations and interpretations, valuable archaeological information is nevertheless gained. In general the data supports observations from the Wilton units at other sites in the region, such as The Havens Cave for the past ca 6400 years.

A wide range of botanical species were exploited (bedding unit), but when compared with The Havens Cave and Kleinpoort Shelter (the other two sites previously discussed in the area), differences are visible. Small underground plant foods such as *Cyperus usitatus* were absent from the site. Instead larger species such as *Watsonia* sp. and *Freezia* sp. were prefered. This may suggest that a more specialised or selective collecting strategy of plant foods was practiced at Groot Kommando-

Table 5. Frequencies of shell and bone from Groot Kommandokloof Shelter.

	BED	PA	SGA	GA	OA	SYS	RB	YA	BCL	TOTAL
OSTRICH EGGSHELL										
Fragments	85	19	23	13	21	27	8		1	**197**
Roughouts	7	1	1	4	1	4				**18**
Beads	14	13	6	4	3	2	1		1	**44**
Pendants		1	1							**2**
Container apetures						1				**1**
Decorated pieces						1				**1**
TOTAL	**106**	**34**	**31**	**21**	**25**	**35**	**9**		**2**	**263**
MARINE SHELL BEADS										
Nassarius kraussianus			2						1	**3**
Burnupena sp.	1									**1**
TOTAL	**1**		**2**						**1**	**4**
BONE										
Ochre stained	1									**1**
Utilised	1									**1**
TOTAL	**2**									**2**

Fig. 6. Burial KK1/1. Note the peculiar hole in the skull.

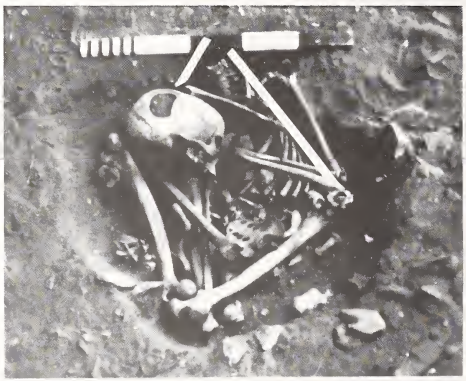

Fig. 7. Burial KK1/1. Note the movement of the bones.

kloof Shelter. The site was probably occupied for short periods at specific points in time to coincide with the availability of certain underground plant foods such as *Watsonia* sp. It can be speculated that these plant foods could support fairly large groups for short periods of time, *i.e.*, seasonal aggregation. It is interesting that no storage pits were found at KK1 and that *P. capensis* and other seeds were virtually absent (this may be due to sampling).

There are also other indicators, from the bedding unit in particular, which support the above speculation that Groot Kommandokloof Shelter was occupied for group activities at specific times of the year. Large numbers of wood shavings indicate active manufacturing as well as maintenance of wooden artefacts. A relatively high frequency of small ostrich eggshell chips, fragments, roughouts and beads and *H. aristatus* seeds and completed beads suggest active ornamental manufacturing (social production) at the site. `Trance figures' among the rock

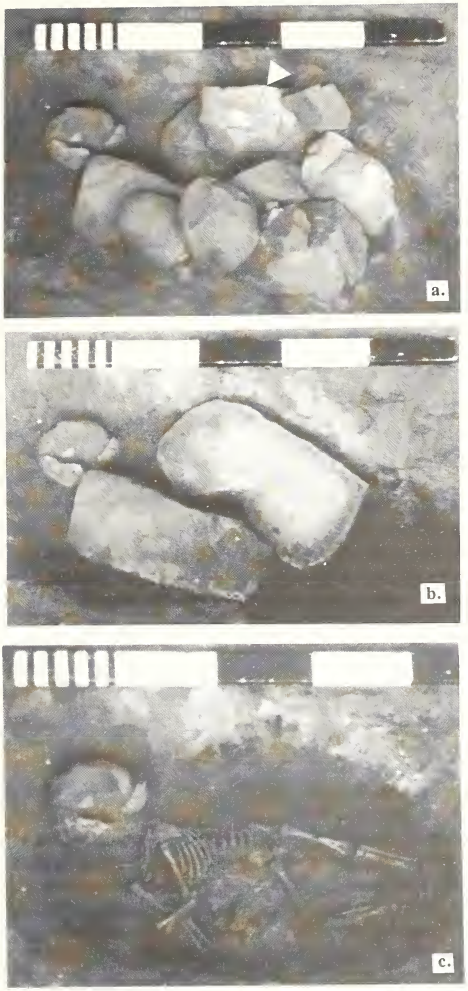

Fig. 8. Burial KK1/2. a. The skull is visible next to the cairn (top left). The arrow points to the possible `painted figure'. b. The two large flat grindstones placed io top of the skeleton.
c. The skeleton in a stretched position.

paintings depicted on the walls also suggest social ceremonies such as trance and healing dances, activities which usually take place during the aggregation phase.

The use of raw material was similar to that at The Havens Cave. Quartzite was the dominant raw material while quartz crystals were prefered for the manufacture of formal tools and other raw materials comprised less than 5,0%.

Raw materials also supply important clues to the spatial meaning of the Baviaanskloof sites in relation to sites elsewhere. Silcrete which was an important raw material at Paardeberg Cave (between 22% and 46% - unpublished report) across the Kouga mountains some 12 km away, was virtually absent at Groot Kommandokloof Shelter. The raw material evidence support the assumption made earlier that a symbolic boundary of some sort existed between groups in the Baviaanskloof and the Langkloof (Binneman 1996, 1997).

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BOOK REVIEW

IMAGES OF POWER UNDERSTANDING SAN ROCK ART

By David Lewis-Williams & Thomas Dowson 1999, 2nd Edition.
Southern Book Publishers. R174-00.

GABRIEL TLHAPI

Rock Art Department, National Museum P.O.Box 266,
Bloemfontein, 9300, Republic of South Africa

email: gtlhapi@nasmus.co.za

A feature of South African society over the last decade has been an increasing awareness of the value and significance of hunter-gatherer or Bushman/San rock art. Part of this awareness involves asking questions about the San lifestyle, religious beliefs and history. The authors of the book under review have tried to answer these questions in a way that appeals to both academic and non-academic audiences.

The authors begin by providing essential background information, discuss who the artists were and outlines San religious beliefs. The perennial questions of how the rock art was made and how old the art is are partially answered, although recent research has made some of this information outdated.

The second part of the book provides detailed examples of San beliefs as they are represented in the rock art. The Medicine Dance and other related shamanistic metaphors are thoroughly discussed. These metaphors are discussed with frequent tacking between text and image(s). On page 61, for example, the way in which diagrams are used to support interpretations is very effective. There have been many books written about rock art but, as a newcomer to the field, none of the books I have read have presented their argument in such a clear and easy to follow manner.

The third part of the book consists of full-colour photographs of San rock art. The illustrations used give a good impression of San rock arts aesthetic. Commendably, the authors have used big pictures and comment on each one, unlike those publications that assume the art to be self-explanatory. Many aspects of rock art such as rain-making, the symbolic labour of shaman have creatively and effectively been covered through the use of photographs and re-drawings. School children and non-academic readers will benefit greatly from the use of visual material in this book. Unlike most writers on the topic, Lewis-Williams & Thomas Dowson have tried to present both rock paintings and engravings. However, according to my calculations, there is still an imbalance since there are only 16 engravings and as many as 106 paintings reproduced in the book.

Part Four of the book is about informing contemporary society on how to view San rock art and outlines appropriate behaviour and procedures to follow when dealing with rock art and site visits. Additional information about where to get more insight about rock art is also provided. Conservation issues are briefly touched on and sites open to the public are also mentioned, although some of these sites are now closed. Notwithstanding a tacked-on reference to Lewis-Williams & Blundell's Fragile Heritage: a rock art field guide, this is the weakest section of the book. A decade in a rapidly-changing country such as ours is a long time and this shows as most of the information in this section is woefully outdated.

In conclusion, the authors did adequate research for their book and this could be detected from the accuracy of the information presented. The general structure of the book is excellent because text and images have been used in tandem and the book has a visually appealing dust-jacket. The authors arguments are logical and effectively illustrated and this will allow students to develop observation skills and logical arguments supported by the available evidence. Terminology is not a problem, as the language is clear and jargon free, and there are no spelling mistakes throughout the book. In my opinion, the authors discourage misconceptions about San history and rock art. They are also trying to present an emic version of San history. This second edition will certainly continue to make as important a contribution to rock art research in the future as it has done over the last ten years in first edition form.

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Southern African Field Archaeology:
Johan Binneman: J.Binneman@ru.ac.za
Lita Webley: L.Webley@ru.ac.za

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